ASSESSORS' HANDBOOK
SECTION 534

RURAL BUILDING COSTS

JANUARY 2006

FOREWORD

This edition of Assessors' Handbook Section 534, *Rural Building Costs*, updates some costs contained in previous editions and includes new data. As with prior editions, pages are printed in loose-leaf form to allow for insertion of revisions by section or page.

There are increases throughout the state for permits and fees to construct buildings. Because of the variations in costs both within and among the counties, it is incumbent on the appraiser to research and analyze permits and fees of jurisdictions within the region and to make adjustments accordingly. In other words, AH 534 should serve as a guide, but an appraiser must research the market to determine which costs are most applicable for the appraisal assignment and temper the data provided in the AH 534 with local cost data.

General instructions and pertinent information concerning the use of this handbook are contained in an introductory section. Specific instructions and comments applicable to each building type will be found in the introductory pages of the section of the manual devoted to that particular type.

Although diligent efforts have been made to supply accurate and reliable information, it is very important to temper this data with local costs, since construction costs may vary both within and among counties.

This revision was prepared by Assessment Policy and Standards Division staff under the direction of the Property and Special Taxes Department.

/s/ Dean Kinnee for

David J. Gau
Deputy Director
Property and Special Taxes Department
State Board of Equalization
January 2006

TABLE OF CONTENTS

AH 534.00: INTRODUCTION

BASIS OF COST

Costs in this manual are based on the cost to build on a level and cleared site in California as of the date at the bottom of each page. The costs are contingent on the following assumptions:

- A clear site
- Normal soil conditions
- Adequate site drainage
- Excludes all off-site improvement cost

The costs in this handbook include normal expenses incurred in placing the improvement or component in the hands of the ultimate consumer including the following:

1. Excavation for foundations, piers, and other structural foundation components
2. Materials
3. Labor
4. Architects' fees
5. Engineering fees
6. Supervision
7. Permits for improvements, land use, environmental impact, etc.
8. Normal utility hook-ups, if any
9. Contractor's overhead and profit
10. Contingencies
11. Carrying charges during construction, e.g., taxes, interest
12. Legal expenses
13. Typical sales commissions, costs, and transfer fees

All data are in the form of in-place costs for improvements and additives that may differ between various structures. The costs in this handbook do not include entrepreneur's profit.

AH 534.10: BASIC FARM BUILDINGS

This section contains specifications and costs for various basic farm buildings including the following:

- Prefabricated horse barns/riding arenas
- General purpose barns
- Hay storage barns
- Feed barns
- Pole buildings
- Shops
- Machinery and equipment sheds
- Prefabricated wood storage sheds
- Small sheds

PREFABRICATED HORSE BARNS

SPECIFICATIONS

Structure	6" steel purlins on 6' centers; enamel exterior
Foundation	Concrete piers
Floor	Dirt
Door	Sliding stall (inside tract)
Roof	2" x 12" pitch; skylight in each stall
Roofing	White 26 gauge steel hi-rib
Walls	Laminated wall panels; grilled fronts; top 4'; 5" colored gutter trim

IN LINE SHED ROW BARN

Stall Size	First Stall	Each Additional Stall
12' x 12'	$3,150	$2,750
12' x 16'	3,650	3,150

Shed roof overhang per square foot: 8' — **$5.00**
12' — **$5.60**

GABLE ROOF BARN—STANDARD BREEZEWAY

Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	$8,200	$6,950
12' x 12' with 16' breezeway	8,650	7,250
12' x 16' with 12' breezeway	9,450	8,250
12' x 16' with 16' breezeway	10,000	8,700

GABLE ROOF BARN—RAISED BREEZEWAY

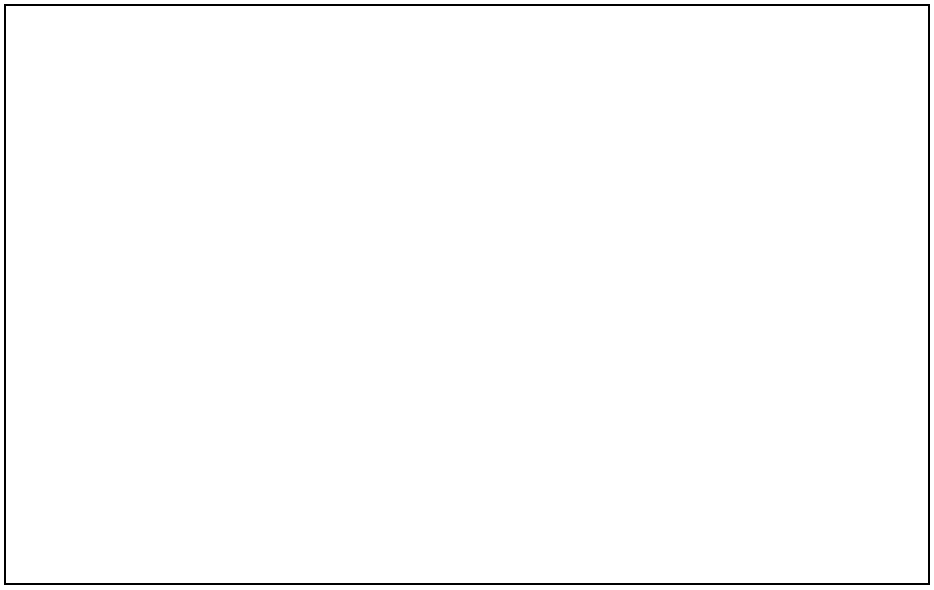
Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	$8,900	$7,700
12' x 12' with 16' breezeway	9,700	8,350
12' x 16' with 12' breezeway	10,200	9,250
12' x 16' with 16' breezeway	11,300	9,900

Roof extension per square foot**—$5.50**
12-foot Breezeway Doors**—$750 each**
16-foot Breezeway Doors**—$850 each**

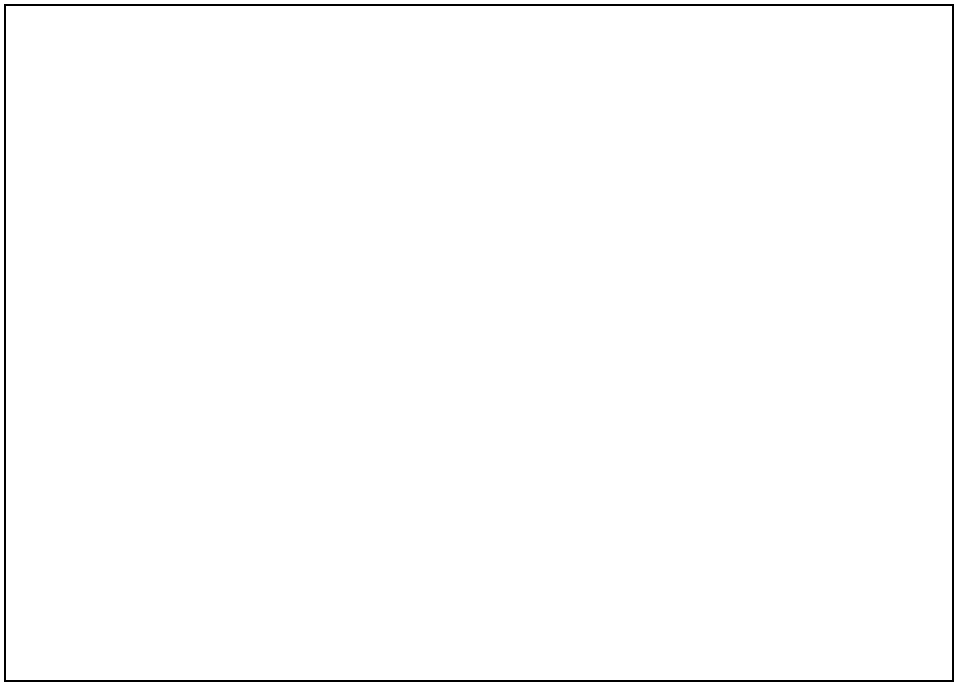
ADDITIVES

Item	Cost
Concrete floor	$4.00 per square foot
Full footing	$10.50 per lineal foot
Portable 5'-4 rail corral panels	$6.75 - $7.75 per lineal foot
Portable 5'-5 rail corral panels	$7.50 - $8.00 per lineal foot
Portable 6' rail corral panels with metal roof	$4.75 - $5.75 per square foot

PREFABRICATED HORSE BARNS



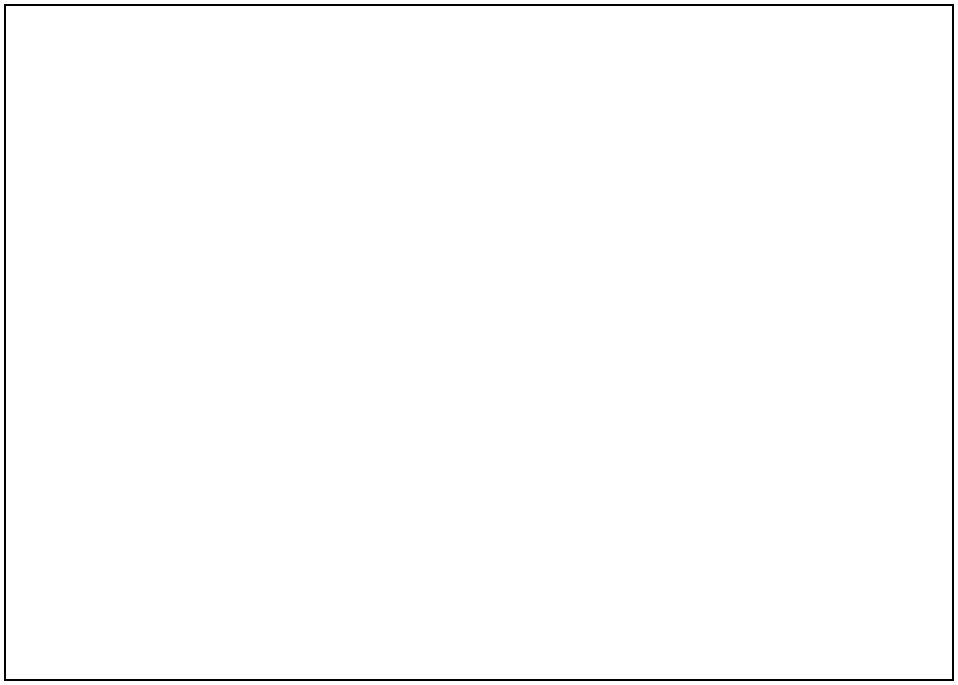
SHED ROW WITH 8 FOOT ROOF EXTENSION



GABLE ROOF WITH RAISED BREEZEWAY

PREFABIRCATED HORSE BARNS

GABLE ROOF—RAISED BREEZEWAY WITH ROOF EXTENSION

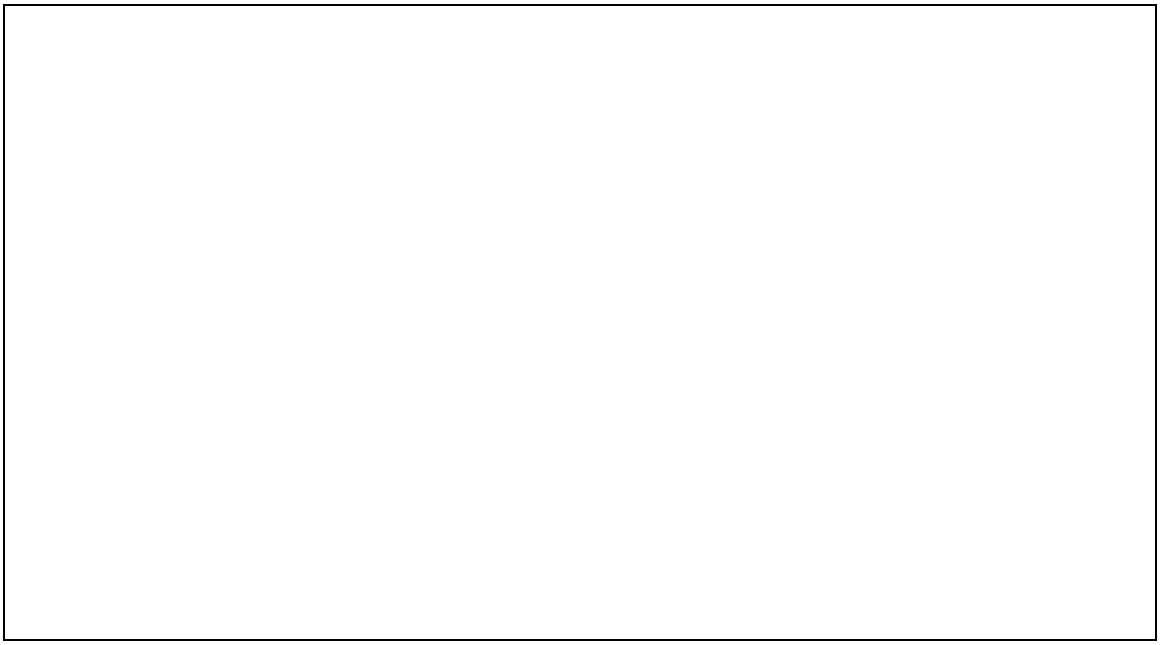


12' X 12' STALL

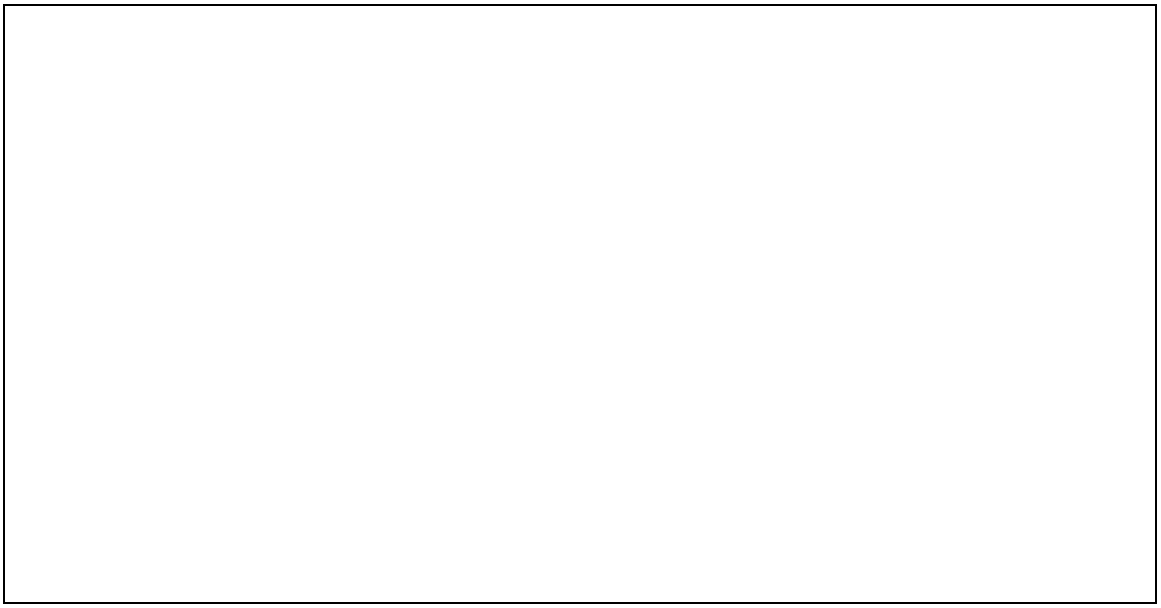
STEEL FRAME RIDING ARENA

Frame	Good quality steel frame, 14' to 16' eave height
Roof	Gable roof with 26-gauge panels
Walls	None
Floor	Sand
Plumbing	Minimum water outlets
Electrical	None—or add $.30 to $.50 per square foot
Cost	**$8.40** to **$9.30** per square foot

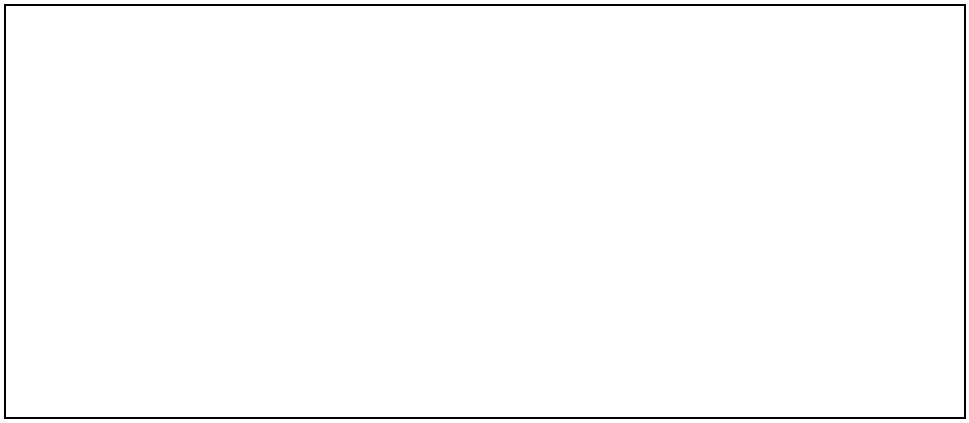
Vinyl Fencing – **$9.00** to **$9.75** per foot



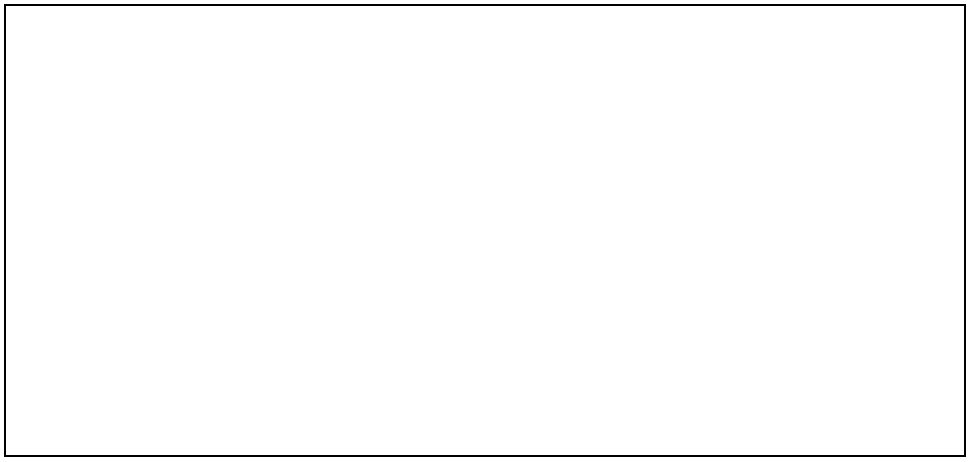
Good Quality Arena



GENERAL PURPOSE BARNS



FAIR QUALITY



AVERAGE QUALITY

GOOD QUALITY

GENERAL PURPOSE BARNS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt/some concrete	Concrete
Wall Structure	Light wood frame, 10' eave height	Average wood frame, 10' eave height	Good wood frame, 10' eave height
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

SQUARE-FOOT COSTS

	Square-Foot Area					
Class	**1,000**	**3,000**	**5,000**	**7,000**	**9,000**	**11,000**
1	14.24	11.04	10.25	9.84	9.46	9.25
2	18.29	14.92	13.87	13.34	13.03	12.61
3	26.68	21.86	20.22	19.47	19.00	18.57

HAY STORAGE BARNS

BUILDING SPECIFICATIONS

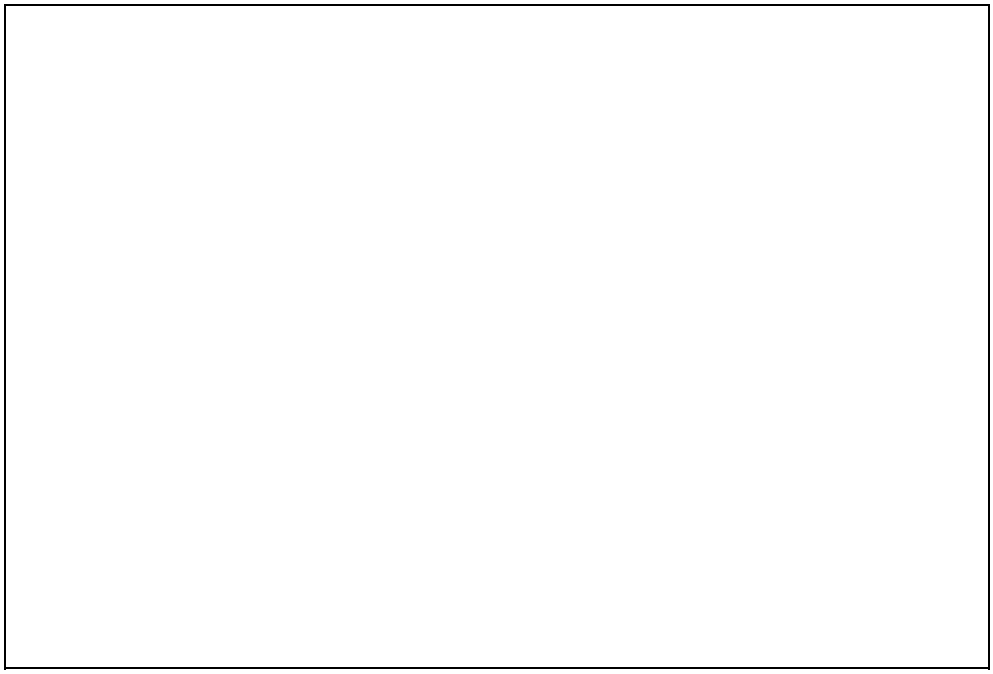
Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Concrete
Wall Structure	Light wood frame, 20' eave height	Average wood frame, 20' eave height	Good wood frame, 20' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets
Shape	Nearly square, length between one and two times width	Nearly square, length between one and two times width	Nearly square, length between one and two times width

SQUARE-FOOT COSTS

	Square-Foot Area					
Class	**1,000**	**3,000**	**5,000**	**7,000**	**9,000**	**11,000**
1	11.41	9.51	8.59	8.01	7.66	7.30
2	13.05	10.84	9.86	9.17	8.70	8.40
3	21.29	17.73	15.94	14.94	14.26	13.71

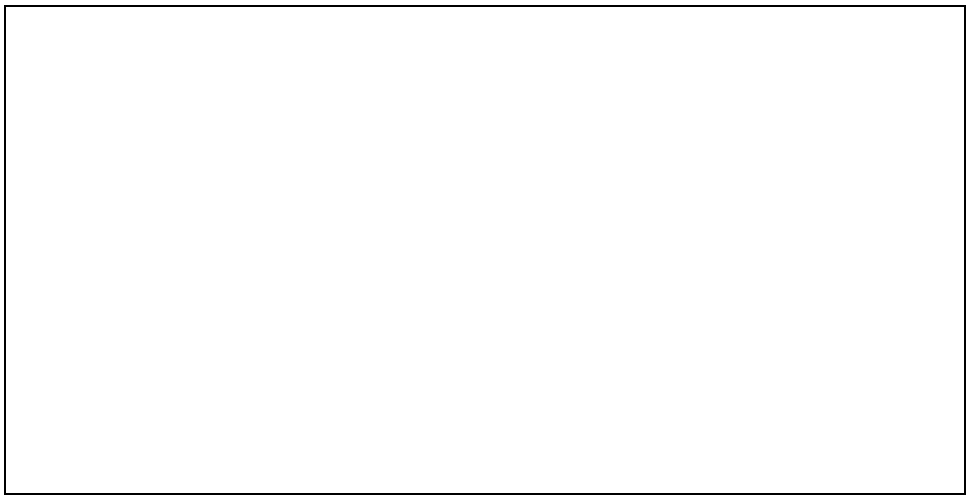
Adjustments: Pole Buildings – Deduct 10% from above costs
No Electricity/No Water – Deduct $.75 to $1.00 per square foot

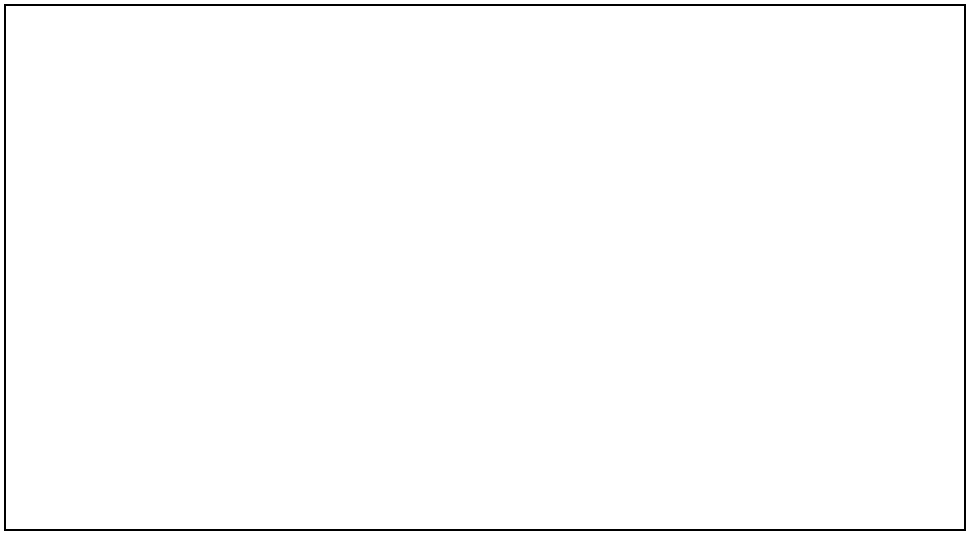
HAY STORAGE BARNS

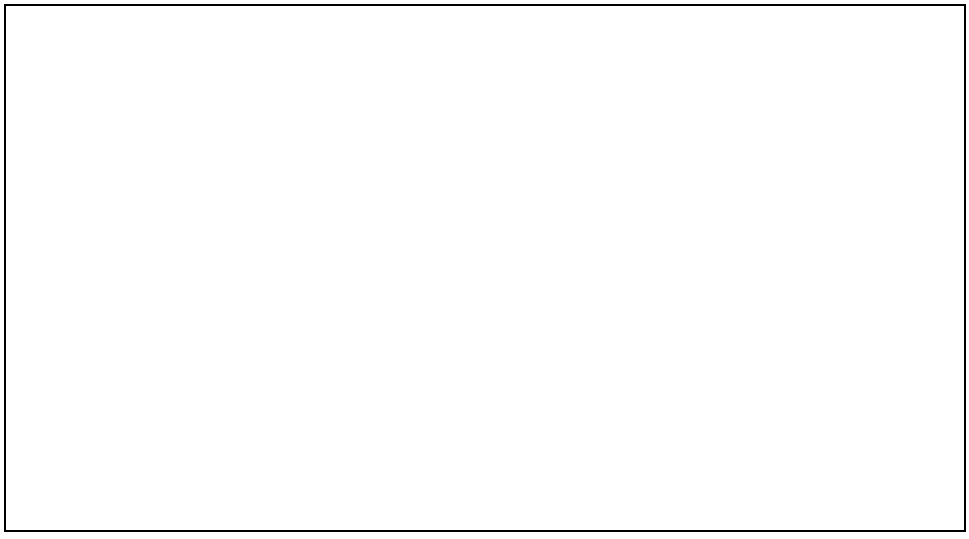


AVERAGE-QUALITY HAY STORAGE BARN

FEED BARNS







FEED BARNS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete in center section	Concrete
Wall Structure	Light wood frame, 8' eave height at drip line	Average wood frame, 8' eave height at drip line	Good wood frame, 8' eave height at drip line
Exterior Wall Cover	Open sides and ends	Open sides, standard gauge corrugated iron, aluminum, or average wood siding on ends	Open sides, good siding painted on ends
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to low pitch—average wood trusses	Medium to low pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

SQUARE-FOOT COSTS

	Square-Foot Area					
Class	1,000	3,000	5,000	7,000	9,000	11,000
1	7.28	6.71	6.43	6.33	6.25	6.19
2	11.49	10.57	10.18	10.05	9.93	9.89
3	13.37	12.28	11.95	11.76	11.65	11.60

POLE BUILDINGS

BUILDING SPECIFICATIONS

Structure	Poles: 15' to 20' on center; wood or steel
Floor	Dirt
Roof	Light trusses; low to medium pitch; wood or steel
Roofing	Galvanized steel or colored steel with gutter
Walls	None, wall height: 18' - 21' to plate

SQUARE-FOOT COSTS **ALL SIDES OPEN** **GOOD QUALITY**

	Side Length									
End Width	**30**	**50**	**80**	**100**	**120**	**140**	**150**	**160**	**180**	**200**
20	6.77	6.45	6.28	6.12	6.01	5.90	5.84	5.79	5.74	5.74
30	6.17	6.01	5.84	5.68	5.58	5.47	5.41	5.36	5.29	5.24
40	5.79	5.63	5.47	5.29	5.13	5.02	4.97	4.97	4.97	4.97
50	5.47	5.29	5.13	4.97	4.80	4.75	4.75	4.75	4.75	4.75
60	5.19	5.03	4.80	4.75	4.75	4.75	4.75	4.75	4.75	4.75
70	5.19	4.97	4.80	4.75	4.75	4.70	4.70	4.70	4.70	4.70
80	5.19	4.97	4.80	4.75	4.75	4.70	4.70	4.70	4.70	4.70

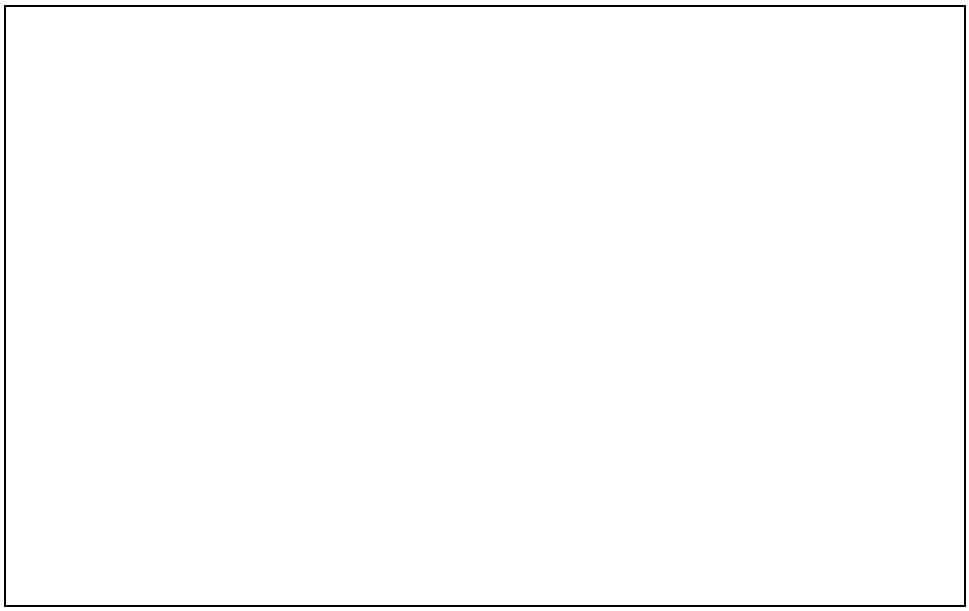
Deduct 15 percent for light duty, fair quality construction.

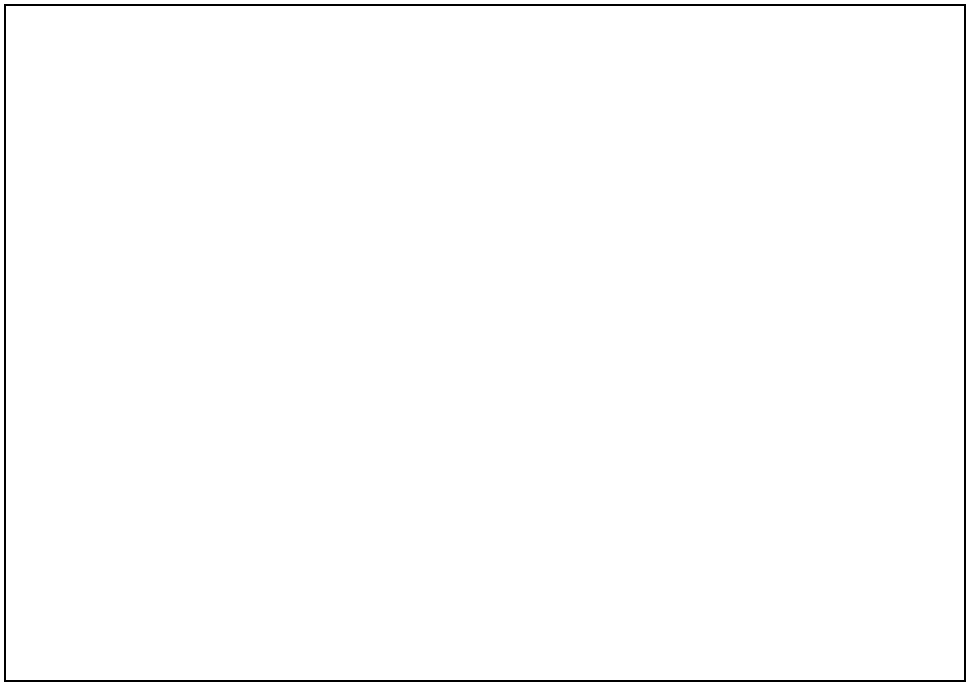
Skylights (2' x 10')	**$100.00** each
Vents (14", Rotary)	**$200.00** each
Poles, In-Place	**$100.00** each
Covered wall area add	**$3.50** per square foot of wall surface

Reinforced Concrete Floors:

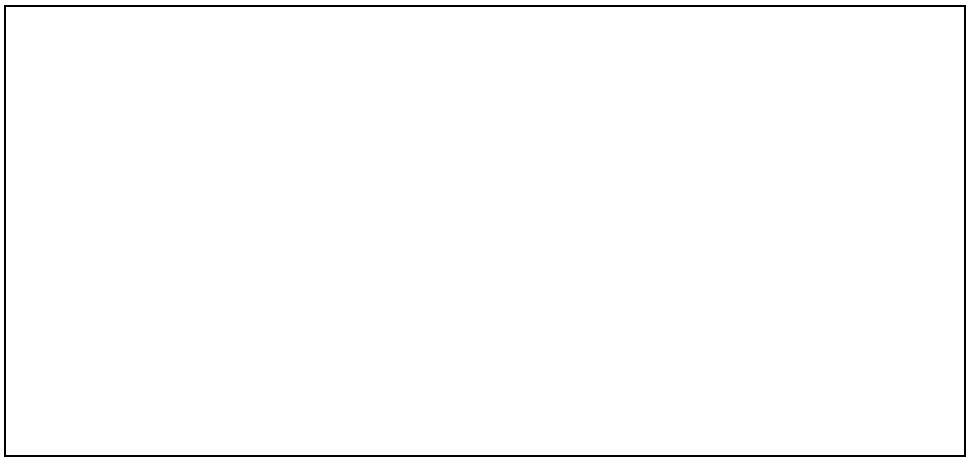
4"	**$3.00** per square foot
6"	**$3.50** per square foot

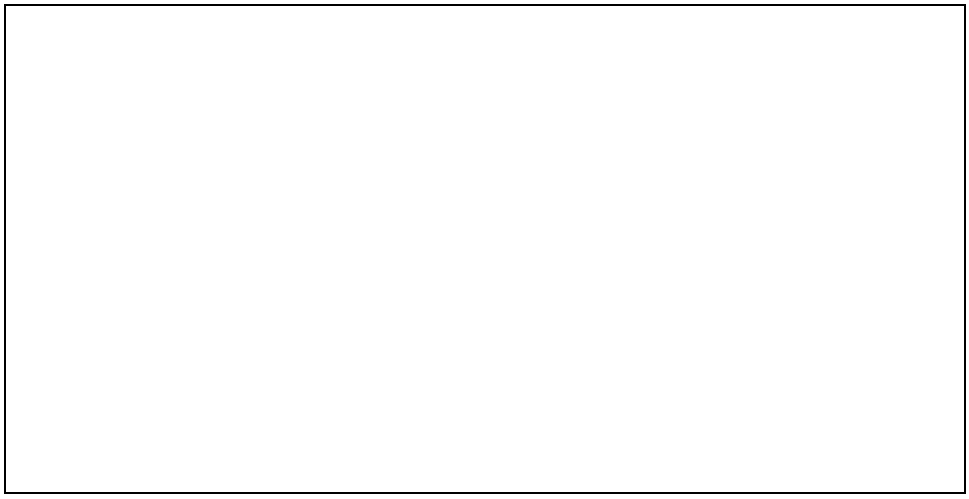
POLE BUILDING

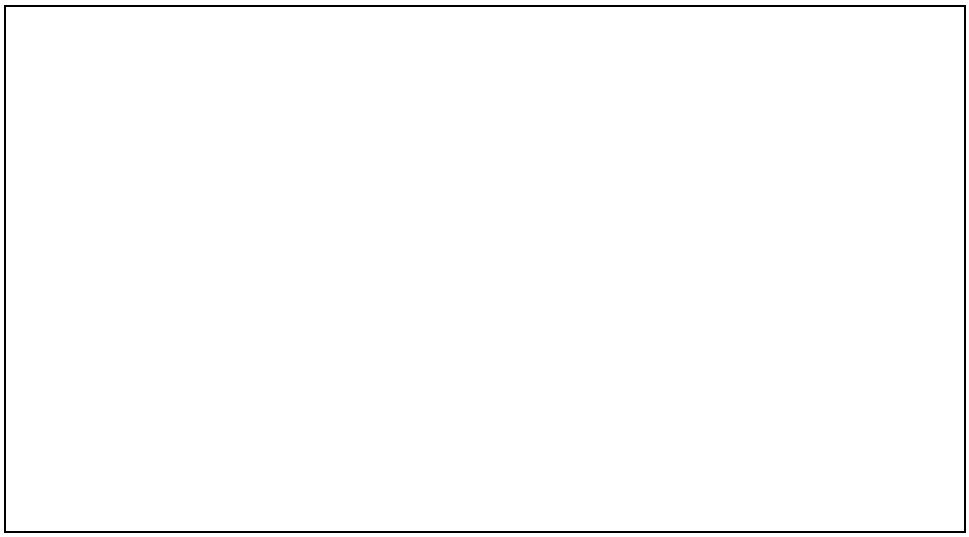




SHOPS







AVERAGE QUALITY SHOPS

SHOPS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Light concrete	Light concrete	Standard concrete
Floor	3" concrete	4" concrete	4" reinforced concrete
Wall Structure	Light wood frame, 15' eave height	Average wood frame, 15' eave height	Good wood frame, insulated, 15' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron, aluminum, or average wood siding	Good wood siding painted or 26-guage steel
Roof Construction	Low to medium pitch— 2" x 4" rafters, 24" to 36" on center, or light wood trusses	Low to medium pitch— average wood trusses	Medium pitch— good wood trusses, insulated roof
Roof Cover	Light aluminum corrugated	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	Two outlets per 1,000 square feet	Two outlets per 1,000 square feet	Excellent lighting and ample outlets
Plumbing	None	One cold water outlet	Two cold water outlets
Doors	One light sliding or swinging door per 2,000 square feet	One average sliding or swinging door per 2,000 square feet	One drive-thru door per 1,000 square feet plus one walk-thru door
Windows	None	None or few low cost	5 percent of floor area
Shape	Nearly square, length between one to three times width	Nearly square, length between one to three times width	Nearly square, length between one to three times width

SQUARE-FOOT COSTS

	Square-Foot Area									
Class	**1,000**	**1,500**	**2,000**	**2,500**	**3,000**	**4,000**	**5,000**	**6,000**	**8,000**	**10,000**
1	15.60	14.30	13.40	12.70	12.10	11.83	11.50	10.90	10.90	10.60
2	19.50	18.00	16.80	16.20	15.60	14.90	14.30	14.00	13.70	13.40
3	22.50	22.50	21.30	20.40	19.50	18.90	18.30	17.70	17.10	16.45

MACHINERY AND EQUIPMENT SHEDS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete	Concrete
Wall Structure	Light wood frame, 10' to 12' eave height	Average wood frame, 10' to 12' eave height	Good wood frame, 10' to 12' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Shape	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length

SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

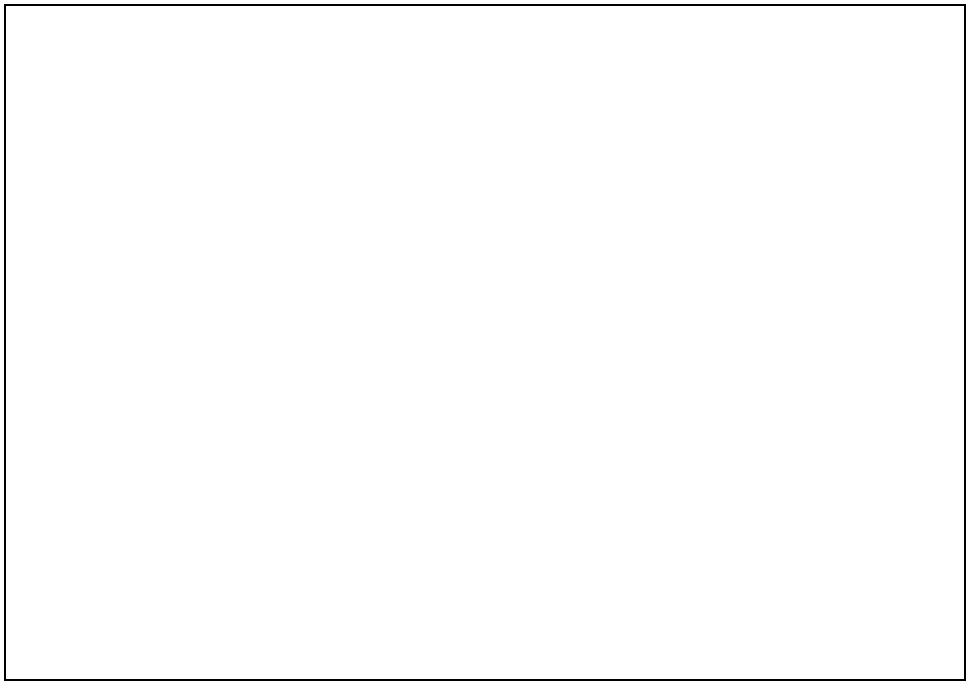
	Square-Foot Area										
Class	**500**	**1,000**	**1,500**	**2,000**	**2,500**	**3,000**	**3,500**	**4,000**	**4,500**	**5,000**	**6,000**
1	9.74	8.75	8.14	7.85	7.98	7.61	7.54	7.44	7.36	7.28	7.24
2	14.29	12.47	11.88	13.64	11.34	11.07	10.99	10.93	10.86	10.81	10.76
3	18.51	16.70	15.54	15.25	14.90	14.73	14.55	14.43	14.33	14.22	14.15

SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

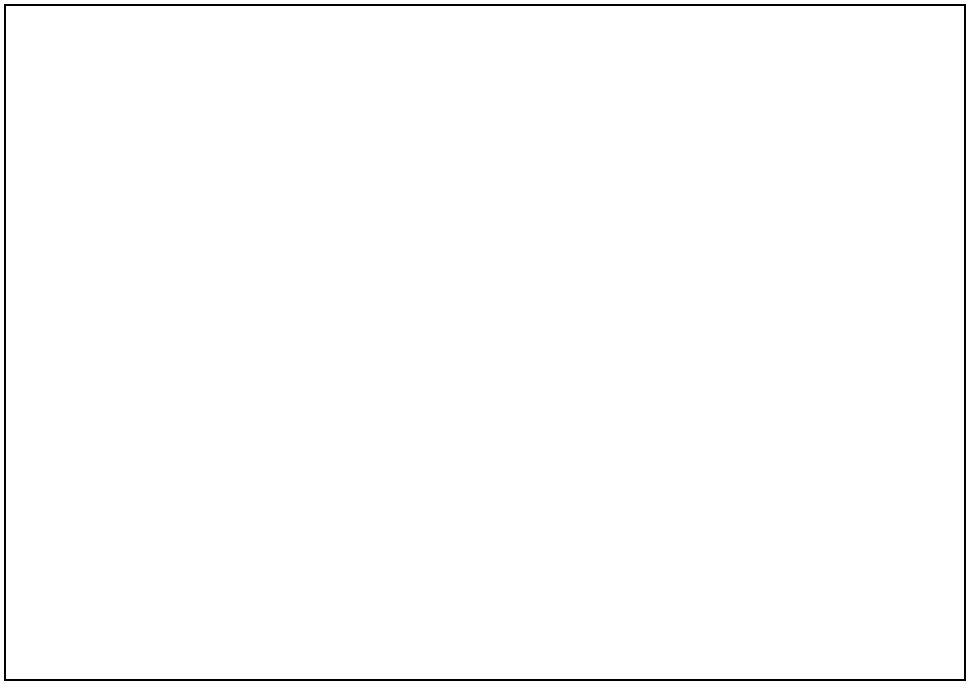
	Square-Foot Area										
Class	**500**	**1,000**	**1,500**	**2,000**	**2,500**	**3,000**	**3,500**	**4,000**	**4,500**	**5,000**	**6,000**
1	8.55	7.18	6.74	6.52	6.40	6.32	6.26	6.20	6.15	6.09	6.04
2	13.07	11.23	10.36	10.05	9.75	9.68	9.52	9.46	9.40	9.30	9.23
3	15.13	14.26	13.74	13.17	12.81	12.64	12.54	12.40	12.35	12.28	12.23

Pole Buildings – Deduct 10% from above costs.

MACHINERY AND EQUIPMENT SHEDS

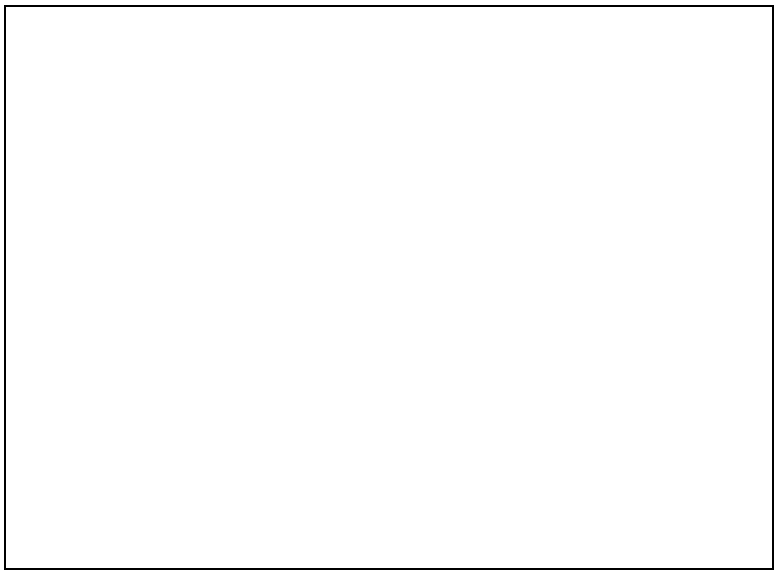


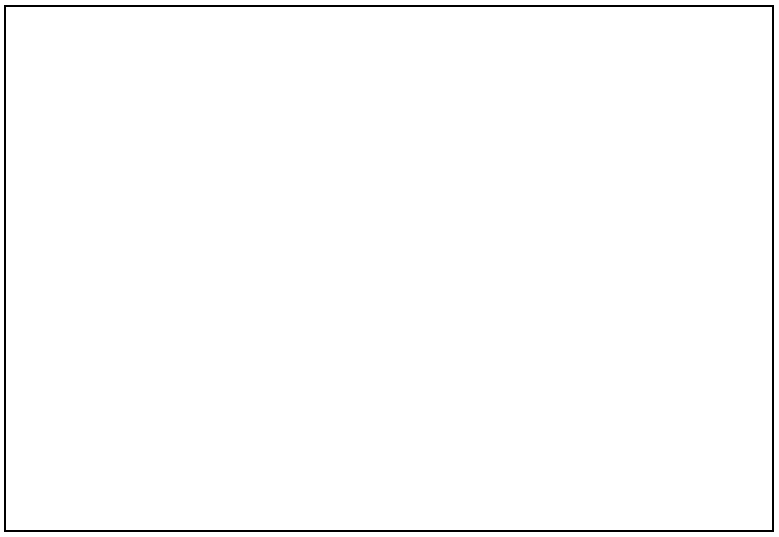
FAIR-QUALITY EQUIPMENT SHED



AVERAGE-QUALITY EQUIPMENT SHED

PREFABRICATED WOOD STORAGE SHEDS





AVERAGE QUALITY

PREFABRICATED WOOD STORAGE SHEDS

Prefabricated wood storage sheds are normally purchased at lumber yards and home improvement centers.

BUILDING SPECIFICATIONS

Foundation	4" x 4" pressure treated skids
Floor	Plywood or particleboard on 2" x 6" floor joists
Walls Structure	2" x 4" framing on 24" centers, 6 ½' to 7 ½' eve height
Exterior Wall Cover	Plywood or T-1-11 with one 4' x 6' door
Roof	Gable low to medium pitch, 2" x 4" rafters
Roof Cover	Metal or composition shingles

SQUARE-FOOT COSTS

Square Feet	Price Per Square Foot
50 to 74	$21.00
75 to 99	$18.50
100 to 139	$16.75
140 to 199	$15.50
200 and up	$12.50 - $14.50

ADDITIVES

Windows	2' x 2'	**$90**
	3' x 2'	**$110**
Doors—Double 6' Wide		**$100**
Skylight—2' x 2'		**$115**
Turbine Vent		**$90**
Shelves—16" wide		**$4.00** per linear foot
Shelves—24" wide		**$4.50** per linear foot
Workbench—24" wide		**$4.50** per linear foot
Steel roll-up door		**$60** per foot (width)
Loft		**$4.00`1** per square foot

SMALL SHEDS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Boards	Concrete
Wall Structure	Light wood frame, 8' eave height	Average wood frame, 8' eave height	Good wood frame, 8' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum, or average framing	Good wood siding, painted, or steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; good steel cover; composition shingles
Electrical	None	None	None
Shape	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length

SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

	Square-Foot Area										
Class	**50**	**60**	**80**	**100**	**120**	**150**	**200**	**250**	**300**	**400**	**500**
1	13.82	12.51	11.19	9.56	9.18	8.58	8.25	7.93	8.42	7.26	6.89
2	19.39	17.43	15.79	14.54	13.82	13.17	12.57	11.91	11.20	10.87	10.55
3	24.47	21.91	20.38	19.11	17.76	16.44	15.45	14.86	14.15	13.82	13.49

SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

	Square-Foot Area										
Class	**50**	**60**	**80**	**100**	**120**	**150**	**200**	**250**	**300**	**400**	**500**
1	9.83	9.18	8.58	7.93	7.21	6.89	6.40	6.02	5.74	5.36	5.19
2	14.54	13.49	12.51	11.79	11.20	10.55	9.84	9.18	8.84	8.58	8.47
3	18.20	16.34	15.79	14.81	13.82	13.17	12.63	11.79	11.20	10.55	10.22

AH 534.20: DAIRY BARNS

This section contains structures and equipment typically used at a dairy. Specifications and costs are provided for the following:

- Commonly used milking parlors
- Rotary barns
- Parallel barns
- Modern Herringbone barns
- Holding, wash, and drip area equipment
- Dairy equipment
- Freestall barn
- Hospital barn
- Corrals
- Commodity barns
- Hay barns
- Miscellaneous equipment
- Septic tanks
- Feedlane stanchions
- Silage pits
- Liquid manure systems
- Feed tanks
- Grade "B" barns
- Stanchion barns
- Walk-through type barns

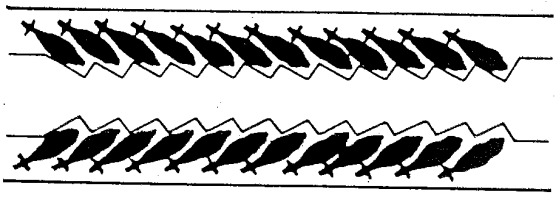
THIS PAGE BLANK

DAIRY BARNS

COMMONLY USED MILKING PARLORS

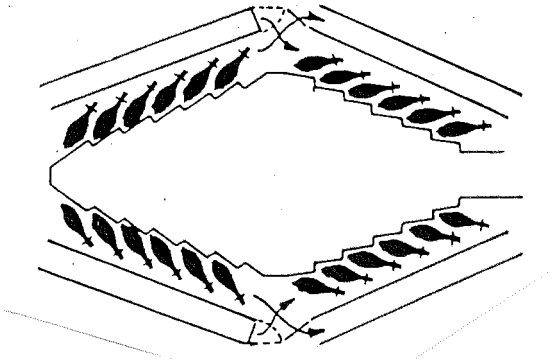
Below are three of the most common styles of milking barns used in California. The most frequently found is the herringbone or sawtooth design. There are several variations of this design. The polygon design is a parlor using multiple sets of herringbone stalls. The parallel design is gaining popularity, especially in larger parlors. The mentioned parlors all have a central pit for the milker, with cows elevated on one or all sides. The following details show basic differences of each design.

HERRINGBONE (DOUBLE 12)



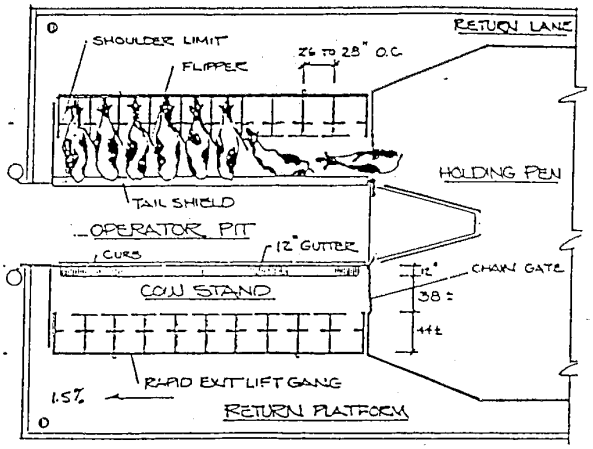
All cows on either side of the pit enter and leave as a group. Newer parlors may have 20 to 30 cows to a side. Some have rapid exit group side release.

POLYGON



Each of the four sides has separate group entry and exit. Usually each side is a herringbone configuration, but can have angle modifications.

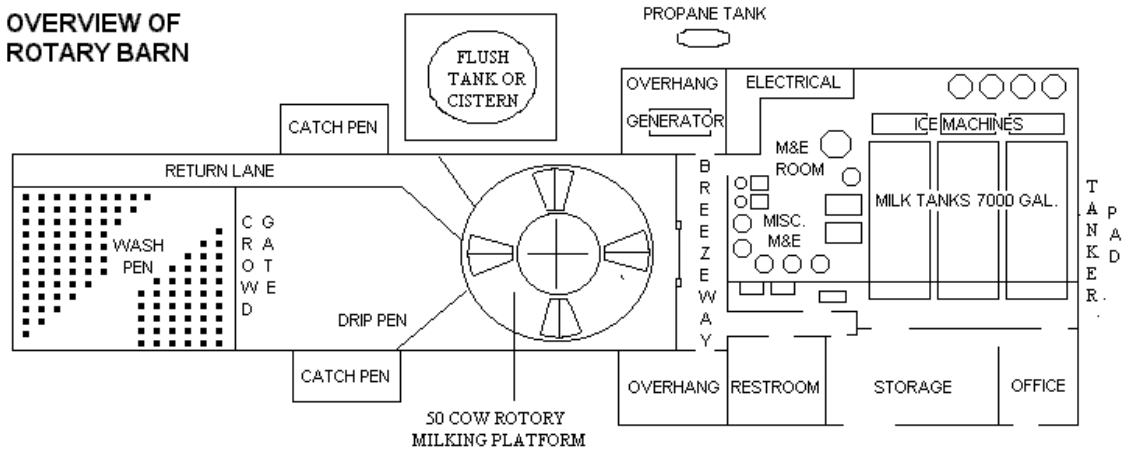
PARALLEL (DOUBLE 10)

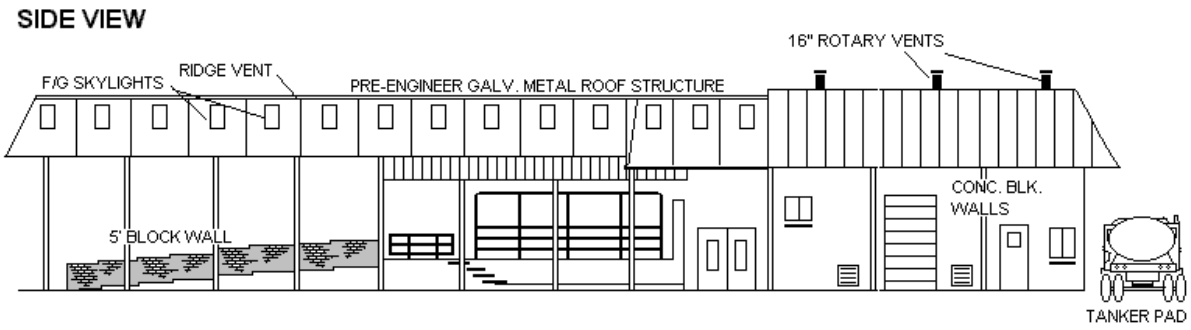


In this design, cows are milked from the rear, rather than the side. Thus, more cows can be milked in a given space than with other designs. Usually a rapid gang exit is present. Typical size is a double 20' to 30'.

DAIRY BARNS

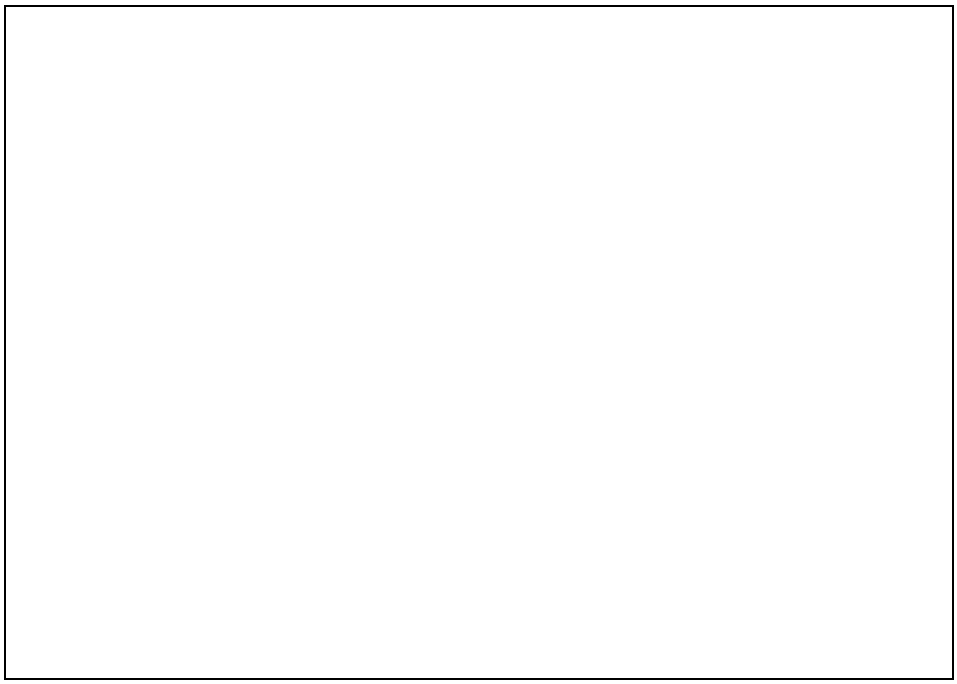
50-COW ROTARY BARN

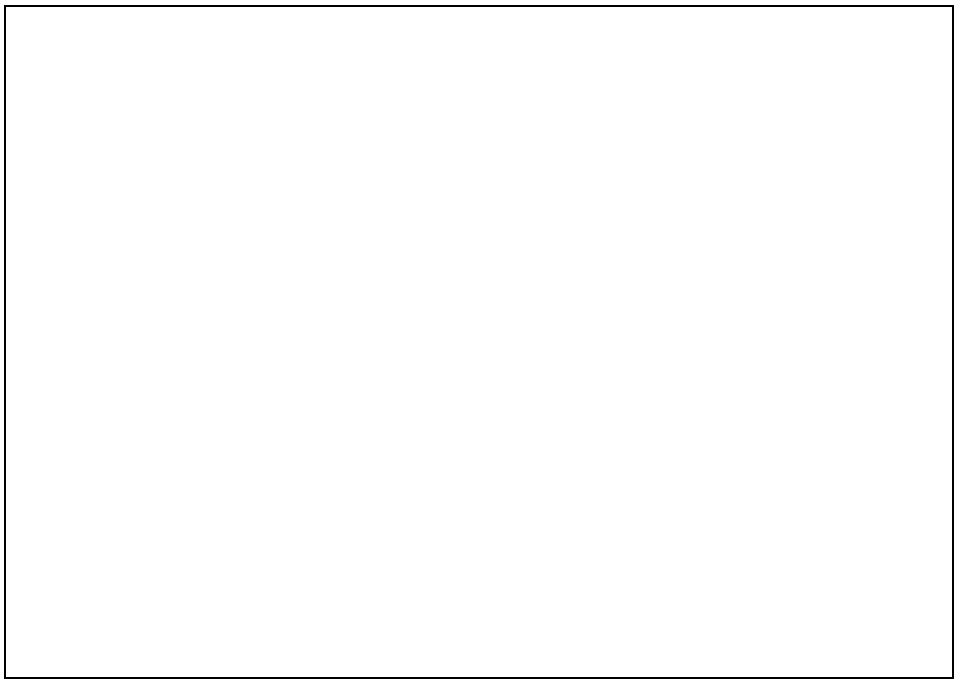




DAIRY BARNS

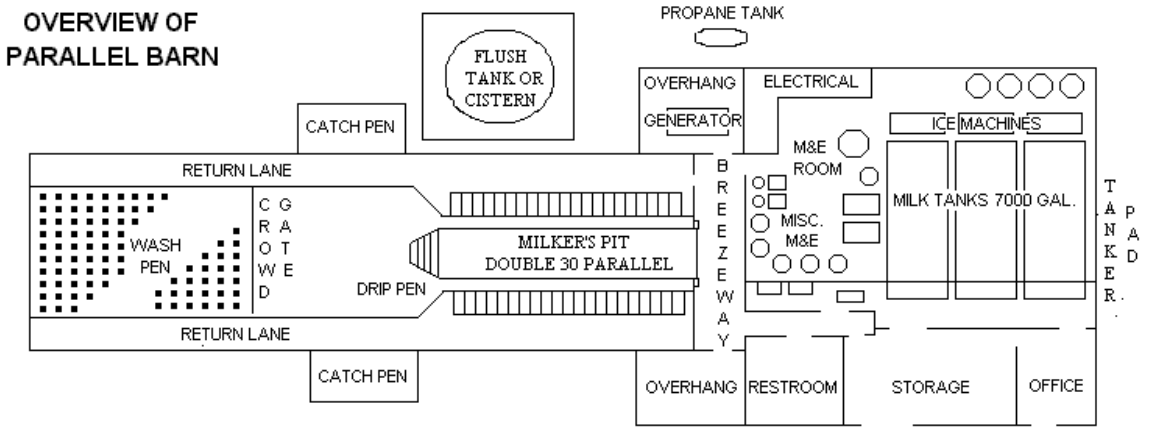
50-COW ROTARY MILKING PARLOR

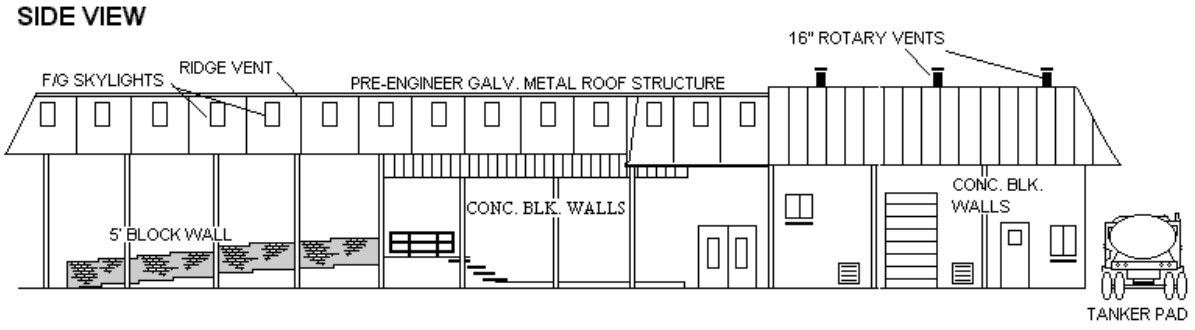




DAIRY BARNS

DOUBLE 30 PARALLEL BARN

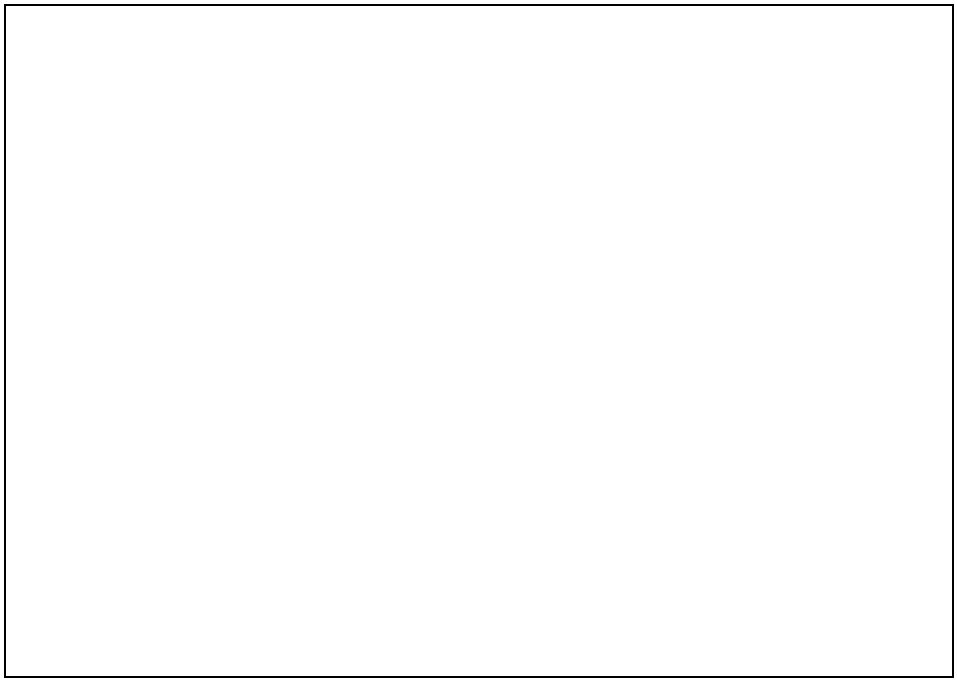




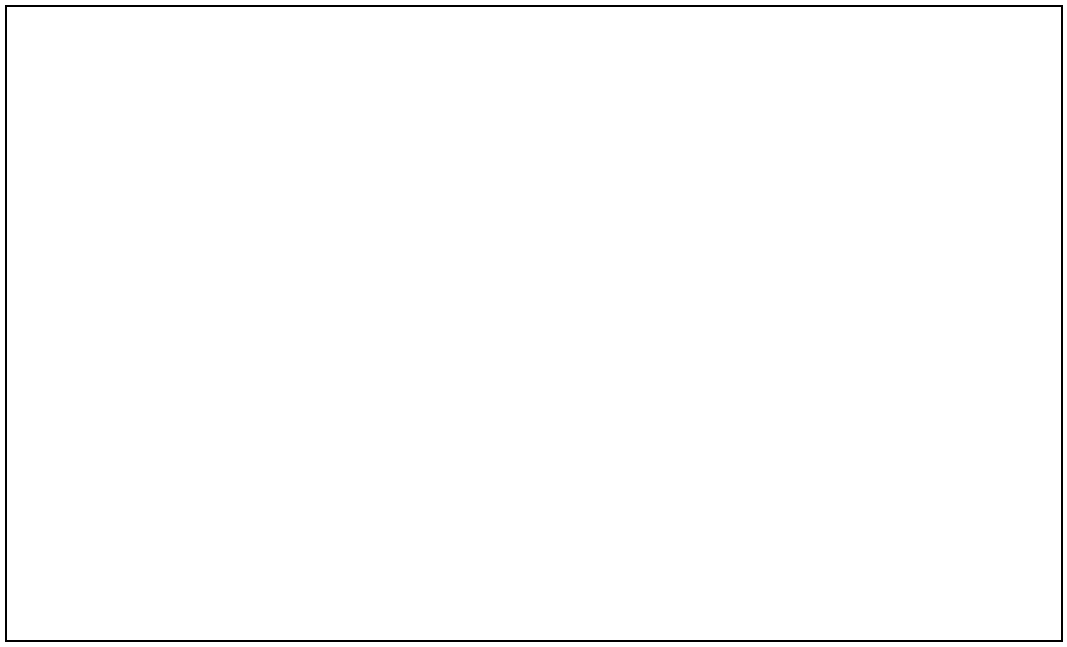
DAIRY BARNS

EXTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

AVERAGE QUALITY



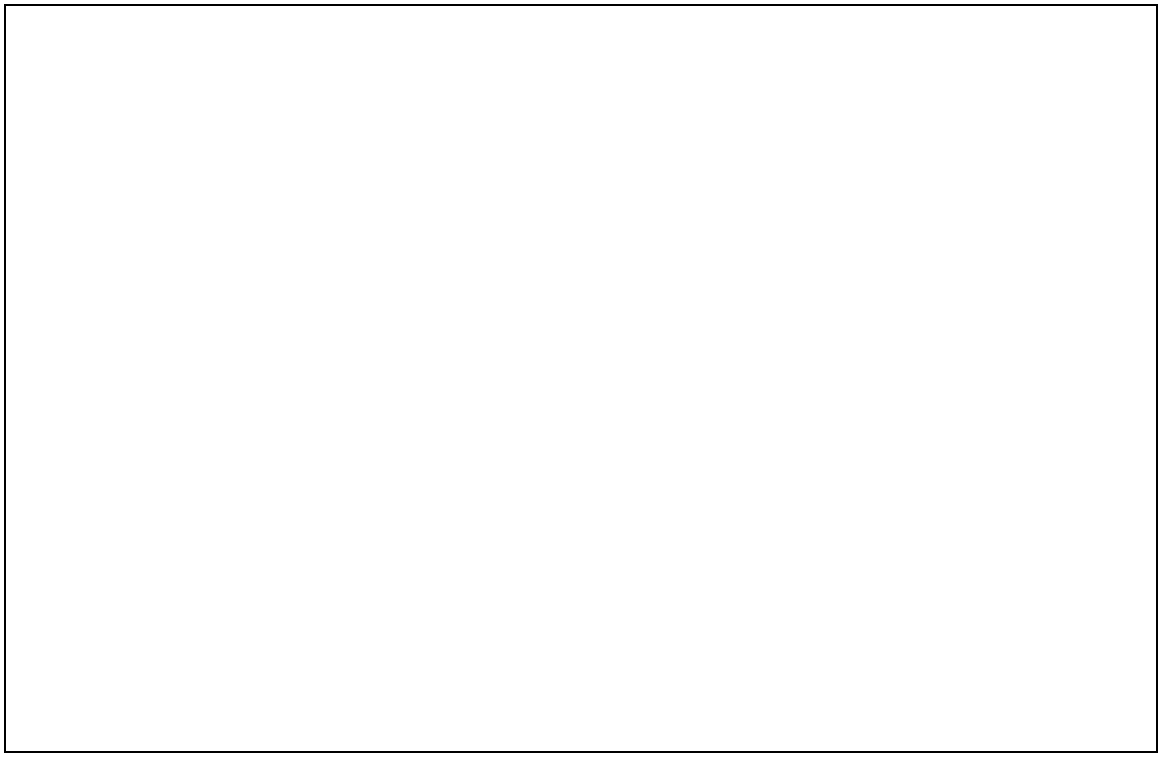
Equipment, office, milk room



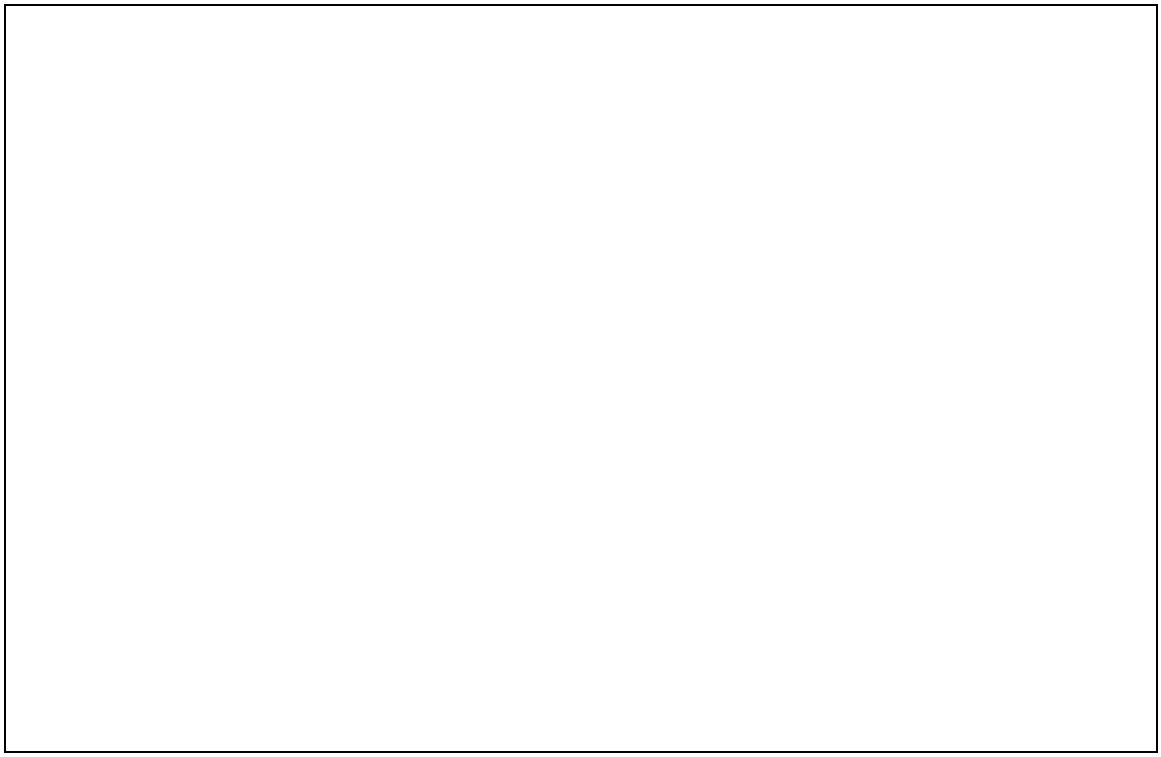
Good Quality

DAIRY BARNS

INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

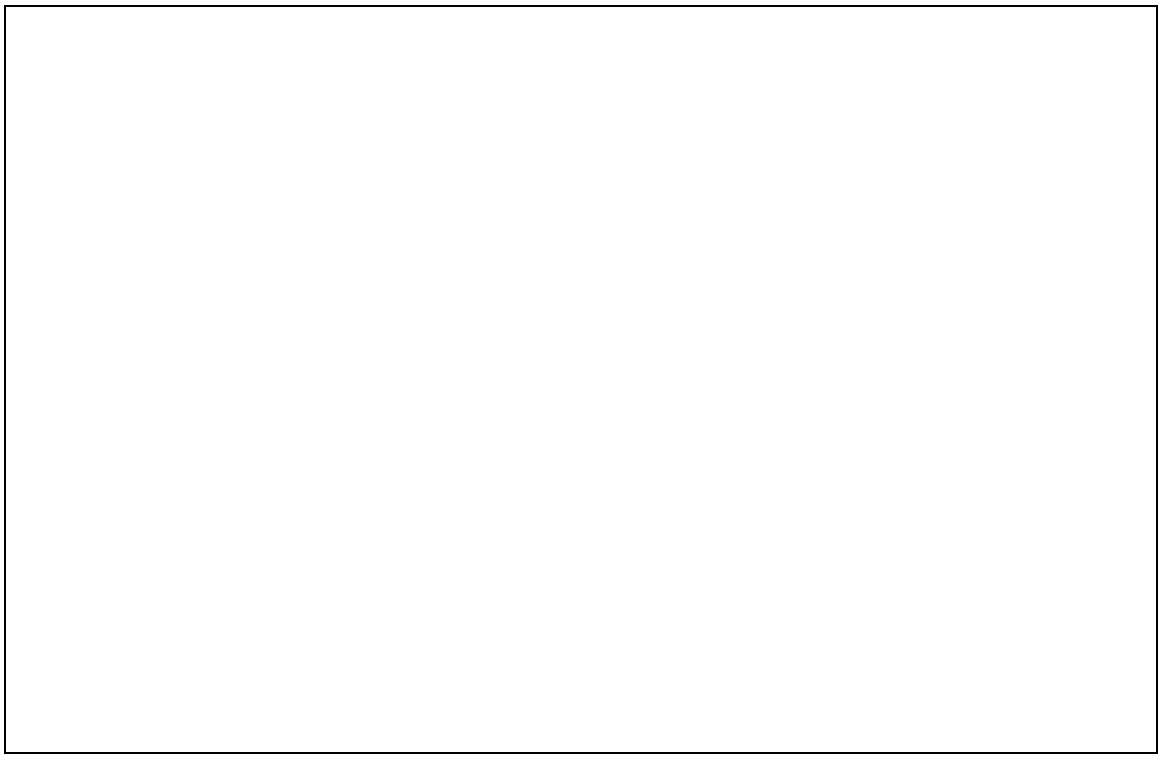


Milk room – good quality

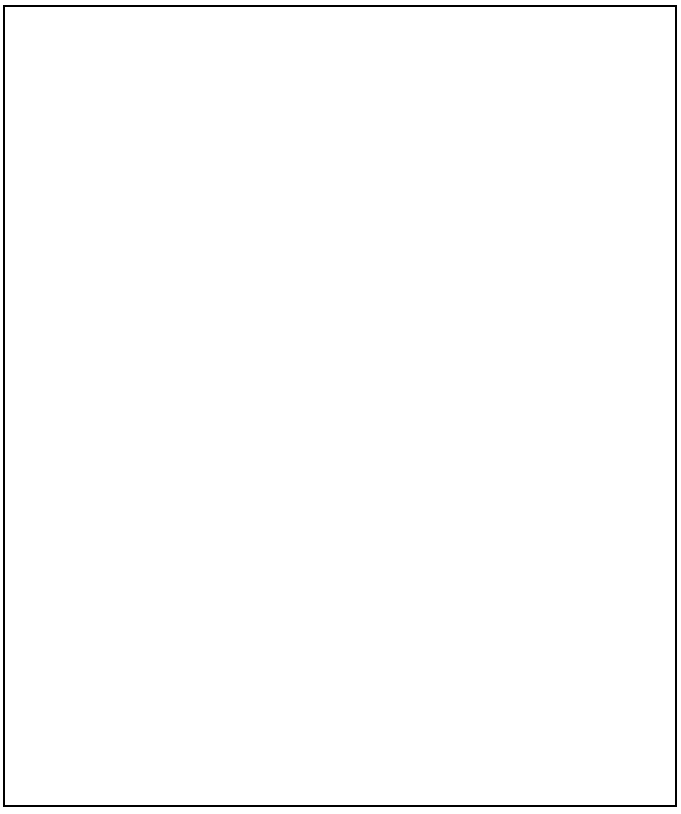


DAIRY BARNS

INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



Milk room – average quality



DAIRY BARNS

MODERN HERRINGBONE, PARALLEL, OR ROTARY

High end of the range in cost is for Sacramento and Northern California

Major electrical to run milking equipment—mains and subpanels, breakers and master start switches—are considered fixtures and are not included in building costs.

EQUIPMENT ROOM, OFFICE, BREEZEWAY, MILK ROOM, RESTROOM, BATH

Components	Average Quality	Good Quality
Foundation	Reinforced concrete	Reinforced concrete
Floors	Concrete slab	Concrete slab, reinforced
Walls	8" concrete block	Concrete block
Exterior	Stucco or concrete block	Stucco and masonry veneer, split face
Roof Structure and Roofing	Average wood frame, corrugated iron roofing	Good wood frame, good quality roofing or steel beams and good steel roofing or tile, skylights, gutters
Windows	Metal sash 10 percent of wall area	Metal sash 10 percent of wall area
Interior	Smooth finish plaster—cove base	Tile
Electrical	Conduit—average fixtures	Conduit—excellent lighting and ample outlets
Plumbing	One stainless steel sink, one water heater, one lavatory, one water closet, usual floor drains	One stainless steel sink, one water heater, ¾ bath, vinyl floor and tape texted walls, usual floor drains
Square-Foot Cost	**$44.00 to $48.00 per square foot**	**$49.00 to $55.00 per square foot**

MILKING PARLOR

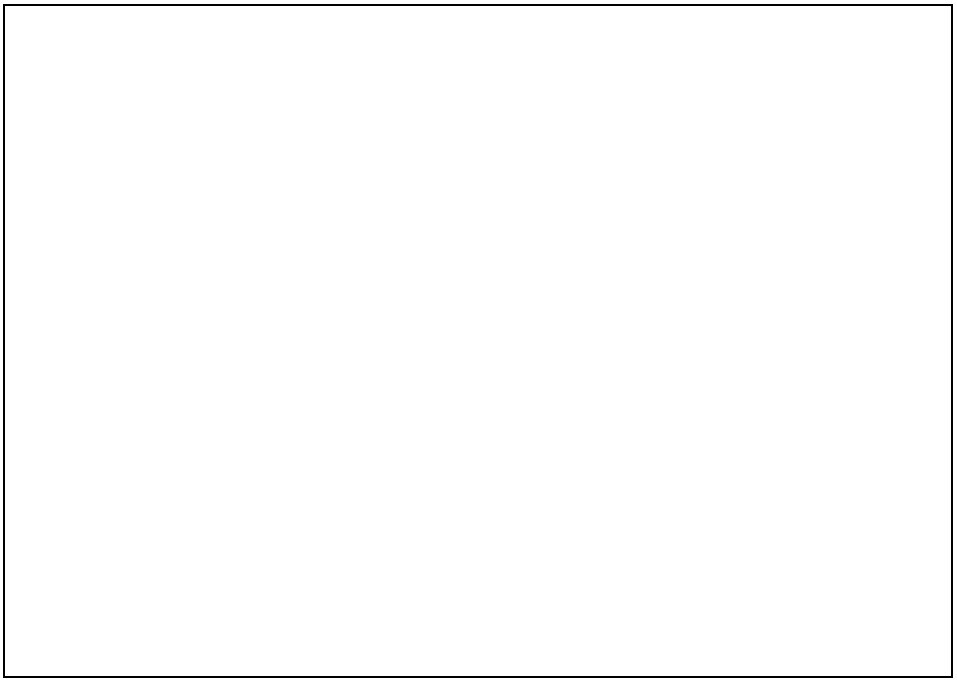
Foundation	6" reinforced concrete
Floors	Concrete slab—well-formed gutters and mangers
Walls	6" or 8" concrete block or reinforced concrete 60" high with 2" x 6"—16" on center framing above, or all concrete block
Roof Structure and Roofing	Average wood frame, corrugated iron roofing or steel beams, good steel roofing, skylights
Windows	Metal sash or metal louvers
Interior	Smooth plaster on entire surface of block walls or some combination of tile and plaster of good quality
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Square-Foot Cost	**Without gates and feeding equipment—$27.00 to $33.50 per square foot**

TOTAL BUILDING COST: includes equipment room, milk room, office, bath, supply, milking parlor, and wash and drip area—Average quality **$32.50 to $35.00**
Good quality **$35.00 to $40.00**

DAIRY BARNS

HOLDING, WASH, AND DRIP AREA EQUIPMENT

Floor or Ramp	Sloping concrete with carborundum finish. $3.00 - $3.30 per square foot
Walls	Concrete block 5' to 6' high with smooth plaster. $40.00 to $45.00 per lineal foot
Metal Rail Fence	Welded pipe 7'—10' o.c. in concrete. $9.50 - $11.50 per lineal foot
Cable Fence	1 1/4" top rail, 2 7/8" post, 7' o.c. 3 cable—$7.50 per lineal foot 4 cable—$8.00 per lineal foot
Gates	54" high, pipe with bracing. $14 per lineal foot of gate width
Sprinkler System	Hooded Rainbird, including pump. $135-$165 per Rainbird, or per double 30 barn—60 cows $17,000 - $18,500
Roof Structure and Roofing	Average quality: Pipe supports, wood or light steel frame and corrugated iron roofing—$4.50 to $6.30 per square foot Good quality: Box beam columns, hot-dip galvanized and box beam galvanized rafters and purlins; quality steel roofing with skylights and electric lighting—$6.50 to $7.75 per square foot
Total Area Cost Including All Components	$17.00 - $19.25 per square foot



Wash Pen

DAIRY BARNS

DAIRY EQUIPMENT

PARALLEL STALLS (DOUBLE 30)

2' x 30' parallel stall package includes galvanized reels, reel support post, sequencing panels, galvanized rump rail assembly, kick bar support, entrance gate, and hardware. 2' x 30' parallel drive kit includes air controls, air tubing, rump panels, drive guards, air cylinders, hardware, stainless steal curbing, and top rail. Air operated catch lane gates include air control ram, hardware to mount, step ladders with hand rails (front), and miscellaneous hardware.	$85,000

VACUUM PUMP

Air vacuum pump with 30 H.P. motor, stand, pulleys, belts, guards, filter assembly, miscellaneous pipe valves, and electrical.	$10,000

PIPELINE AND EQUIPMENT

Claws with pulsators and pulsator controller, master control panel, 2 H.P. milk pump, milk receiver, jetter assembly and hose, fresh air kit, C.I.P. sink. Also includes all stainless steel pipelines, elbows, valves, all PVC lines, electrical wiring and panels, and miscellaneous hardware.	$85,000

MILK TRANSFER SYSTEM

Control assembly and miscellaneous equipment.	$4,400

DETACHERS

Air operated retraction with both manual and automatic operation, indicator lights indicating milking mode and milk flow, air operated shutoff valve/sensor combination, all related electric wiring, air filter, and hardware.	$73,000

MILK TANKS (7,000 GALLON)

2 stainless steel 7,000-gallon tanks with agitators and wash pumps. Includes control panel, calibration gauge, temperature recorder with probe assembly, hot milk alarm, miscellaneous piping, and electrical.	$103,000

REFRIGERATION SYSTEM

Freon compressor, air condensors, related hardware, pipes, valves, and electrical. Plate cooler with 100 plates and all hardware.	$46,000

Above costs include tax and labor

DAIRY BARNS

DAIRY EQUIPMENT

HEAT RECOVERY SYSTEM

Heat recovery system and all hardware.	$10,400

HOT WATER SYSTEM

Boiler with insulated 500-gallon storage tank, insulated piping, and electrical.	$14,000

SPRINKLER PEN HARDWARE

Pumps, Rainbird, and all related pipelines and miscellaneous hardware.	$19,700

AIR COMPRESSOR

10 H.P. air compressor with 120-gallon tank. Includes miscellaneous hardware and electrical.	$7,800

ELECTRIC OR AIR CROWD GATE

30 to 50 foot electric gate with track and control kit, motor, panel, and electrical.	$16,600

Above costs include tax and labor

Total equipment cost for double 30 parallel $475,000 Rounded

EQUIPMENT ONLY (Including tax and labor)

Double 14' Parallel	Total - $280,000 to $290,000
Double 16' Parallel	Total - $305,000 to $320,000
Double 18' Parallel	Total - $325,000 to $350,000
Double 24' Herringbone	Total - $400,000 to $425,000
Double 25' Parallel	Total - $415,000 to $435,000
Double 30' Parallel	Total - $450,000 to $490,000
50-Cow Rotary Barn	Total - $550,000 to $580,000

DAIRY BARNS

FREESTALL BARN

STANCHIONS, LOOPS, AND FENCES

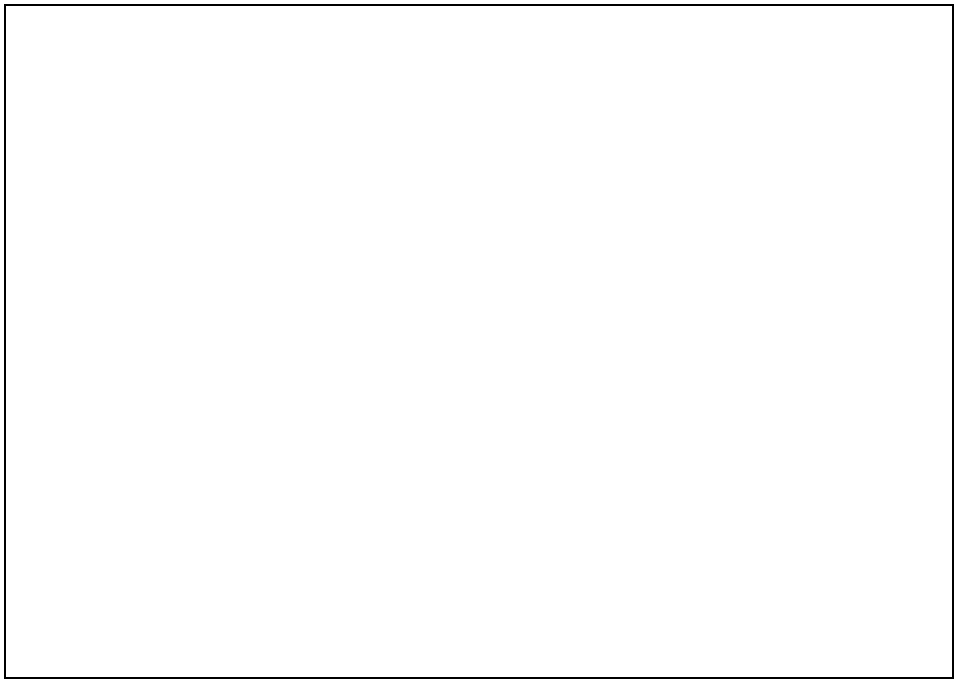
Foundation	Reinforced concrete
Floors	Sloping concrete with dirt in loop areas. Concrete drive lanes and flush areas.
Walls	Open; poles with steel supports
Roof Structure	Steel frame with steel cover; good quality, with gutters
Electrical	Minimum lighting
Plumbing	Water troughs in each pen with underground flushing
Stanchions	Steel; self locking – 5 hole per 10 feet
Fencing	Cable with steel or wood posts
Capacity	250 to 600 cows; one stanchion per cow
Cost	**$800 to $1,000 per stanchion or $8.00 to $10.00 per square foot**

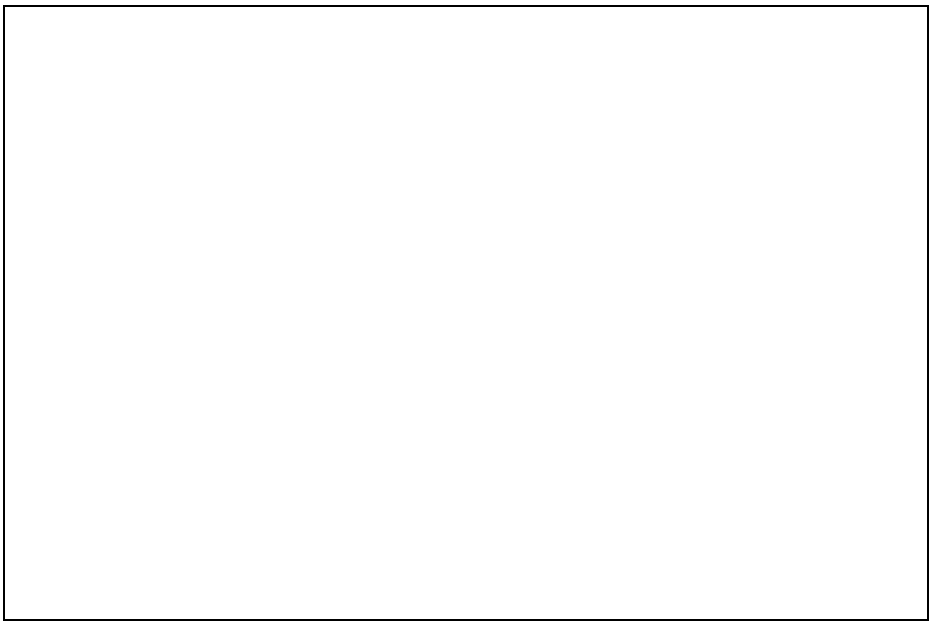
Some barns now have 10% more stanchions and cows than beds.

Hot dipped galvanized steel framed barns – add 5% to above costs.

DAIRY BARNS

FREESTALL BARN





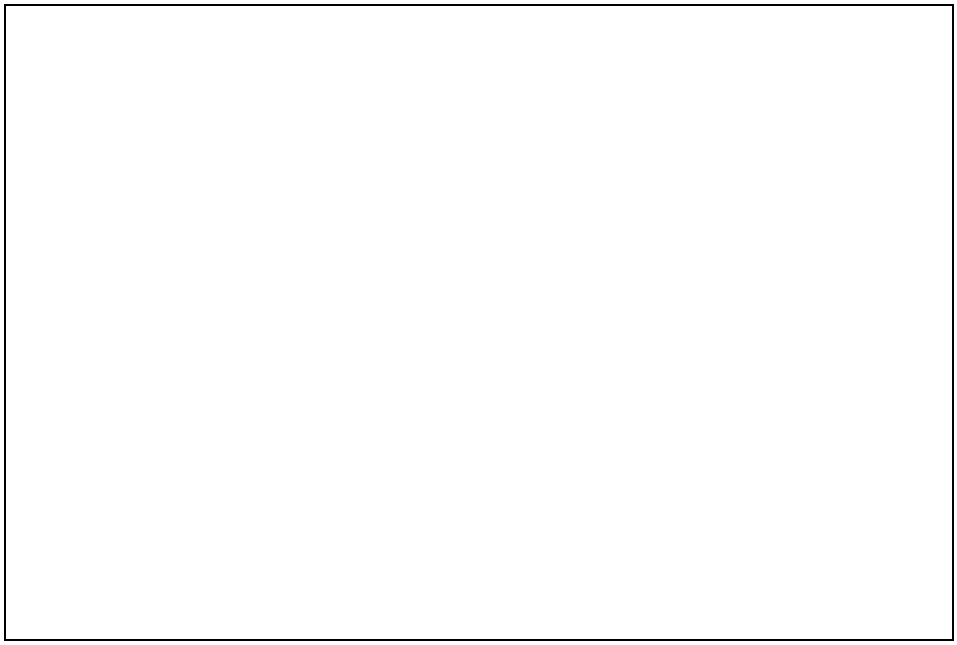
DAIRY BARNS

HOSPITAL BARN

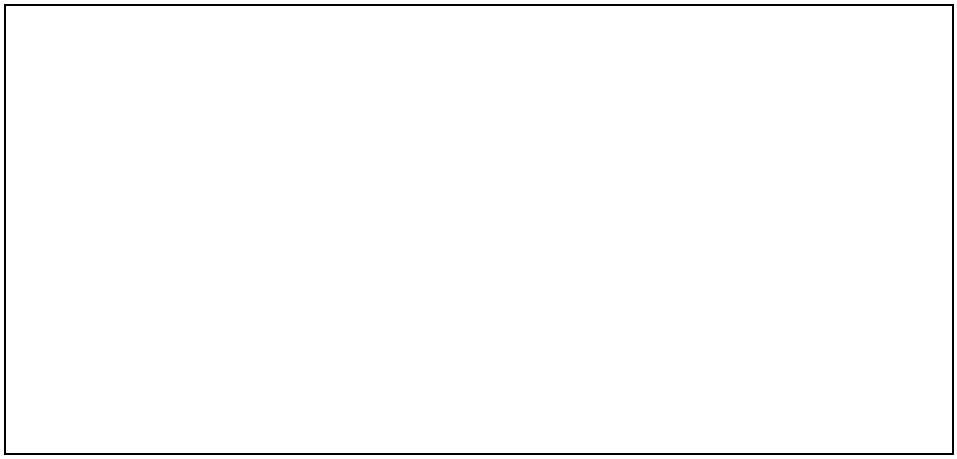
AVERAGE QUALITY

Floors	Concret slab with flush curbs
Walls	Light steel poles, all sides open
Roof	Average wood frame or light metal, with metal cover
Interior	Several small pens with metal pipe fencing and gates and water troughs
Electrical	Average light fixtures
Plumbing	Concrete water troughs
Cost	**$6.30 to $6.75 per square foot**

Hospital barns without small divided pens, with dirt floors, low to average quality: **$4.40 to $5.00** per square foot



Hospital Barn – Average Quality



DAIRY BARNS

CORRALS

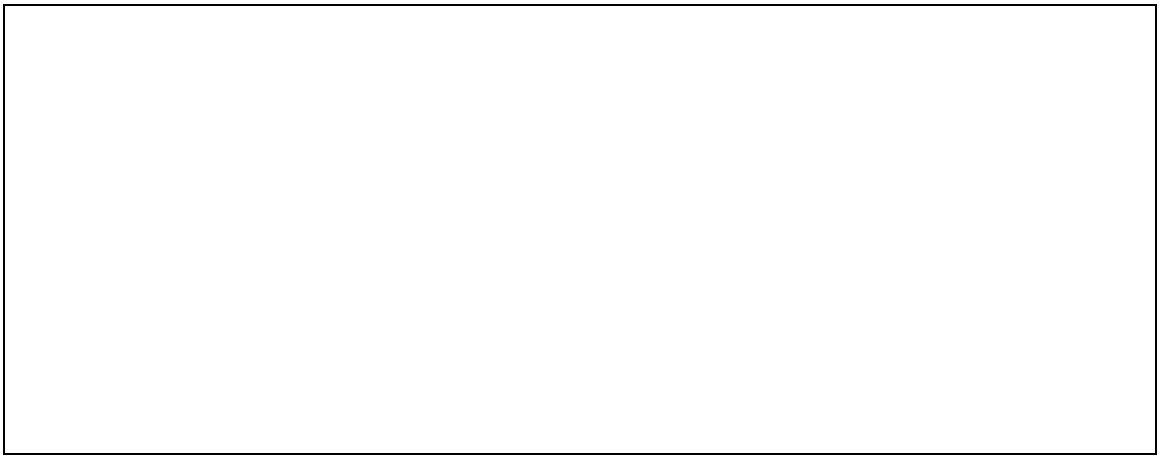
Components	Cost
Concrete Flatwork Large areas/not reinforced	4" to 4½"—$1.75 to $2.10 per square foot 6"—$2.10 to $2.40 per square foot
Rubber Belting	$1.50 to $2.25 per square foot
Curbs	8" x 16"—$6.50 per lineal foot 8" x 24"—$8.00 per lineal foot
Cable Fence	2 3/8" top rail, 2 7/8" post—10' o.c. 3 cable—$8.00 per lineal foot 4 cable—$8.50 per lineal foot
Concrete Water Tank	$550 to $600 each
Steel Stanchions Without Stanchion Curb	$38.00 to $43.00 each hole $19.00 to $21.00 per lineal foot
Steel Self-Locking Stanchions Without Stanchion Curb	$40.00 to $44.00 each hole $20.00 to $22.00 per lineal foot
12" PVC Flush Line	$9.00 per foot
Sump Pumps	3 HP $2,600.00 5 HP $3,500.00
Floating Agitator Pump	75 HP $15,000 to $17,000 40 HP $11,000 to $12,000
Gates	12' to 16'—$120 to $150 each
Loafing Sheds	Wood—$3.80 - $4.80 per square foot Steel—$4.40 - $5.75 per square foot

COMMODITY BARNS

	Per Square Foot
With Dividers	$10.00 - $13.50
Without Dividers	$8.50 - $10.50

COMMODITY BARN ADDITIVES

Concrete Dividers—8' high 6" thick	$90.00 per lineal foot or $11.25 per square foot

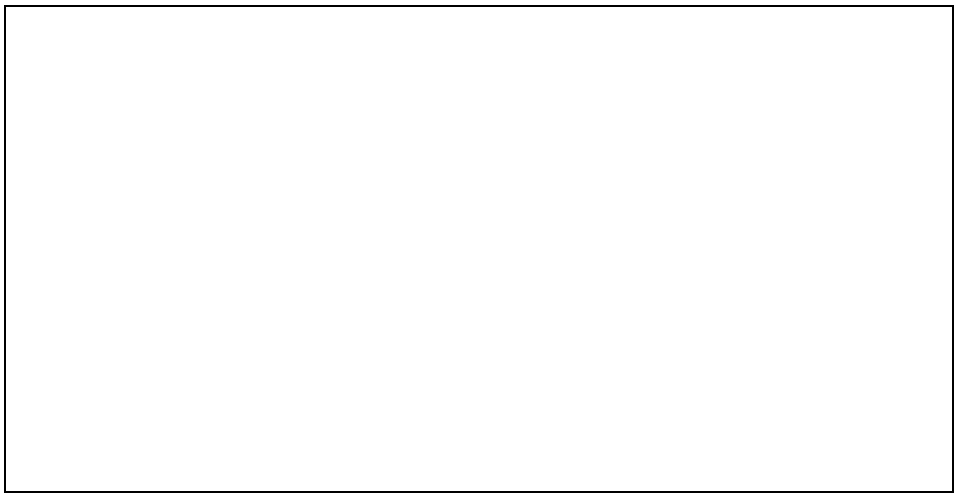


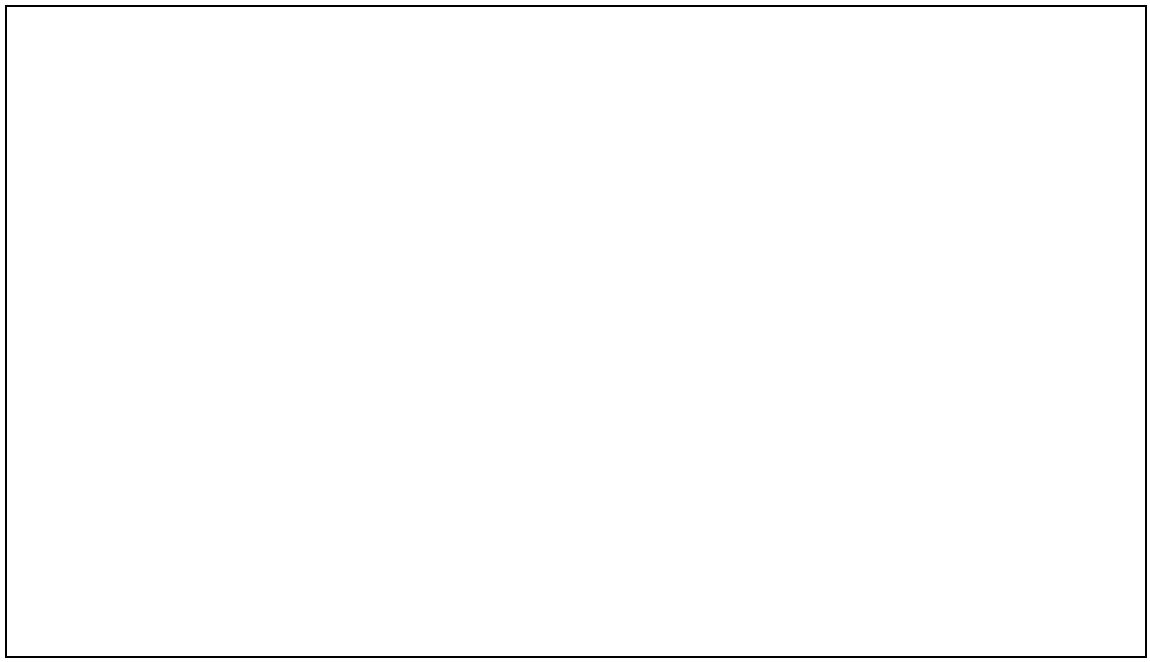
Commodity Barn with Dividers – Average Quality

DAIRY BARNS

HAY BARNS

Floors	Dirt
Walls	Open; used oil field pipe to support roof
Roof	20' eve; low pitch; light wood or steel frame; metal cover
Electrical	None
Plumbing	None
Cost	**$3.00 to $3.60 per square foot**





DAIRY BARNS

MISCELLANEOUS

CURBS

	Per Lineal Foot
8" x 8"	$3.00 to $3.50
8" x 16"	$6.00 to $6.50
8" x 20"	$7.00

CABLE FENCE

	Per Lineal Foot
2 3/8" top rail with 2 7/8" post 10' o.c.	3 cable—$8.00 4 cable—$8.50 5 cable—$9.00
Cattle guard	$1,000 to $1,500 each

SOLID RAIL FENCE

	Per Lineal Foot
(4) 2 3/8" rails with 2 7/8" post 10' o.c.	$11.00 - $12.50

TANKER PAD

	Per Square Foot
6" to 7" rebar reinforced concrete with footings	$2.40 - $2.70

WATER TROUGHS

Concrete Water Troughs - 2' x 12'	$400 to $450
Concrete Water Troughs - 2' x 16'	$450 to $550
Mineral Troughs - 20'	$135 to $165

CORRAL SHADES

	Per Square Foot
Pipe poles, wood frame, metal cover	$1.75 - $2.00
Pipe poles, steel frame, metal cover	$2.00 - $2.50

WATER LINES

2" Water line	$2.00 per lineal foot
3" Water line	$2.25 per lineal foot
12" Flush line	$9.00 per lineal foot
18" Drain line	$11.40 per lineal foot
Flush valves	$1,000 each
Drain boxes	$1,100 each

DAIRY BARNS

MISCELLANEOUS

SEPTIC TANKS

1,000 – 1,500 gallon with lines	$3,500 - $4,000
Cistern - per gallon	$.60 to $.65

BARN FANS

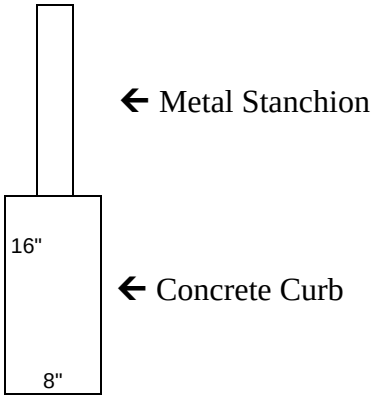
With misters and automatic controls	$700 to $900 each—installed

FEEDLANE STANCHIONS WITH CURB

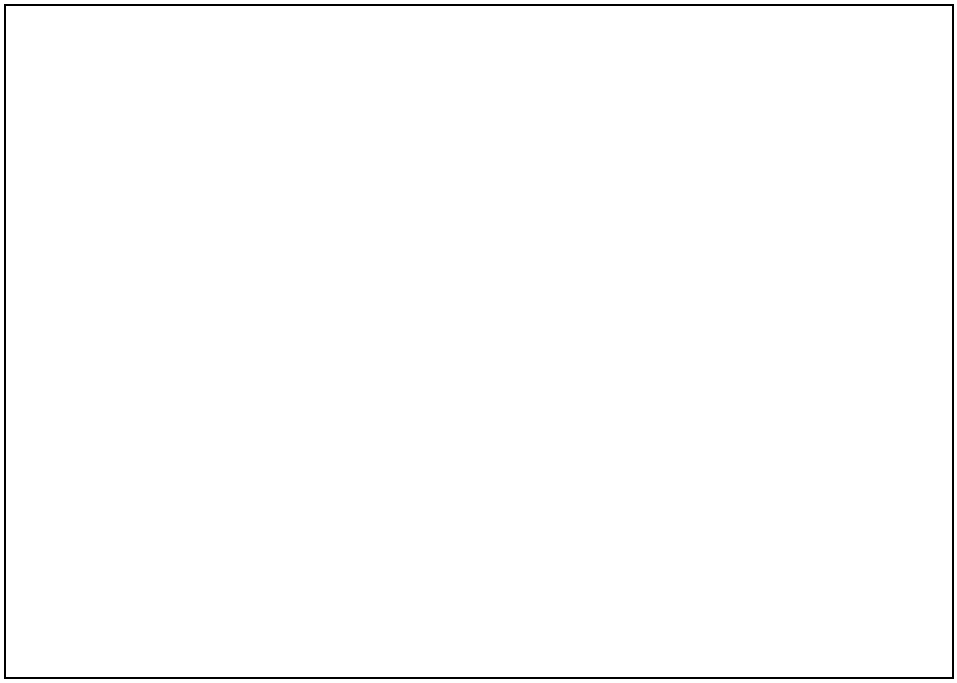
Galvanized stanchions, 5–hole/10'
Cow-type self-locking with release
with 2 7/8" post in 8" x 16" concrete curb

Cost Per Lineal Foot: **$28.50**, stanchion and curb only

Additional concrete
- Drivelane 6" reinforced - **$2.10 - $2.50** per sq. ft.
- Walklane 4" concrete - **$1.75 - $2.00** per sq. ft.
- Flush curb 8" x 8" - **$3.50** per lineal foot



Cow lane 12' wide with locking stanchions and stanchion curb and 10' feed lane	**$73.20** per lineal foot



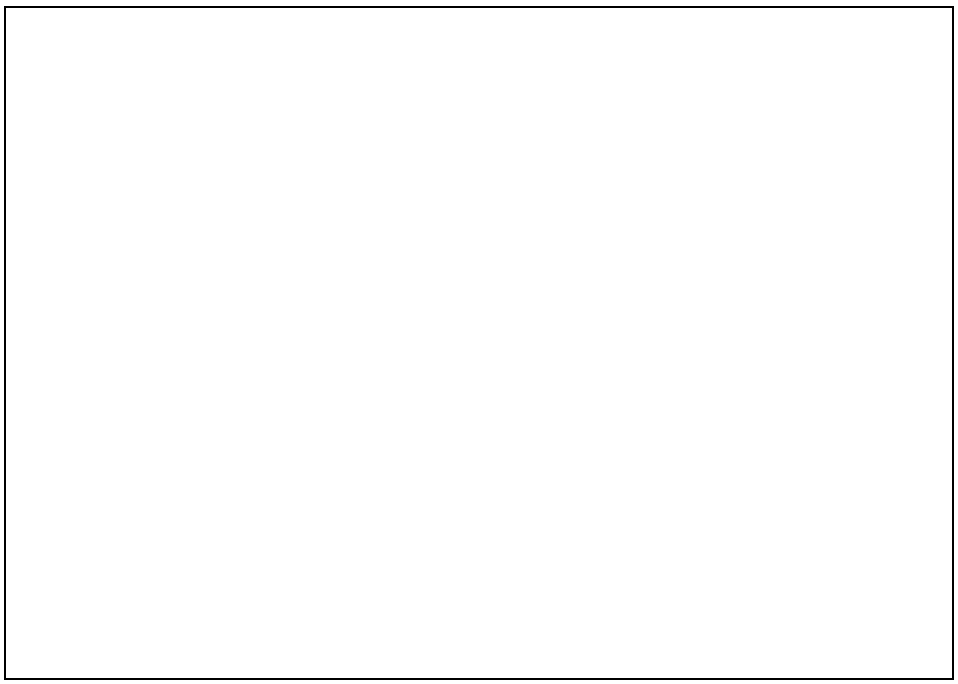
Feedlane Stanchions

DAIRY BARNS

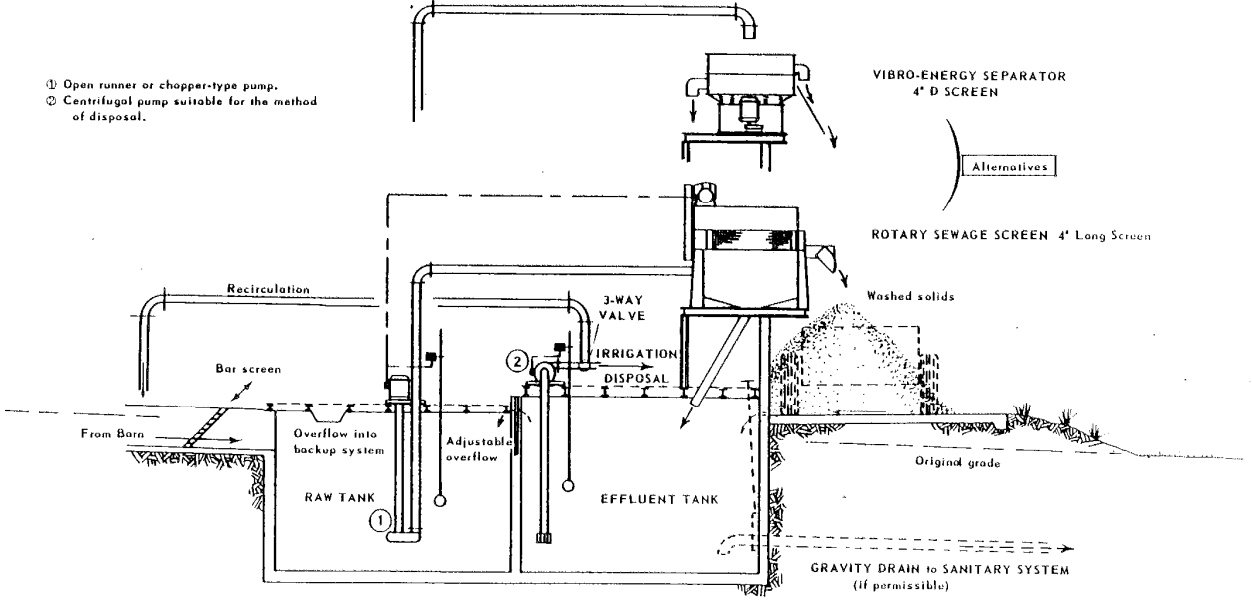
SILAGE PITS

Tilt-up of 6" concrete or 8" reinforced concrete block, 8' high, and enclosed on three sides with 6" concrete slabs.

Size	Price Per Square Foot
75 x 100	$3.90
100 x 200	$3.25
100 x 300	$3.10



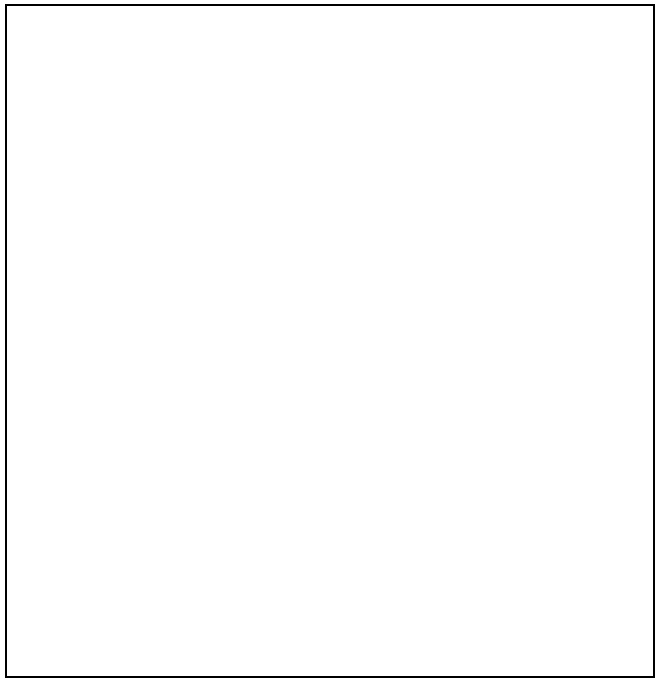
Concrete Silage Slab Only
5 ½" to 6" reinforced with footings - **$1.90 to $2.20** with footings
6" rebar reinforced with footings - **$2.50**


① Open runner or chopper-type pump.
② Centrifugal pump suitable for the method of disposal.
VIBRO-ENERGY SEPARATOR
4" D SCREEN
Alternatives
ROTARY SEWAGE SCREEN 4' Long Screen
Recirculation
3-WAY VALVE
IRRIGATION
DISPOSAL
Washed solids
Bar screen
From Barn
Overflow into backup system
Adjustable overflow
RAW TANK
EFFLUENT TANK
Original grade
GRAVITY DRAIN to SANITARY SYSTEM
(if permissible)

DAIRY BARNS

PAINTED STEEL BULK FEED TANKS ON CONCRETE PAD/With Hopper Bottom

Components	Cost
5 Ton	$1,600
9 Ton	2,300
10.5 Ton	2,450
13 Ton	2,700
15 Ton	3,150
20 Ton	4,000
25 Ton	4,400
31 Ton	5,100
34 Ton	5,300
40 Ton	6,100
45 Ton	7,000
60 Ton	7,800



ADDITIVES AND ACCESSORIES

Feeder lines (Per lineal foot)	$ 6.90
Partition	300.00
Ladder	100.00 -150.00
Augar	200.00 - 255.00

DAIRY BARNS

GRADE "B" BARNS

Use upper end of cost range for Sacramento Valley and north

MILK HOUSE

Foundation	Concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 5 percent of wall area
Interior	Smooth finish plaster
Electrical	Fair fixtures
Plumbing	One wash basin
Square-Foot Cost	**$33.25 to $41.00 per square foot (including breezeway)**

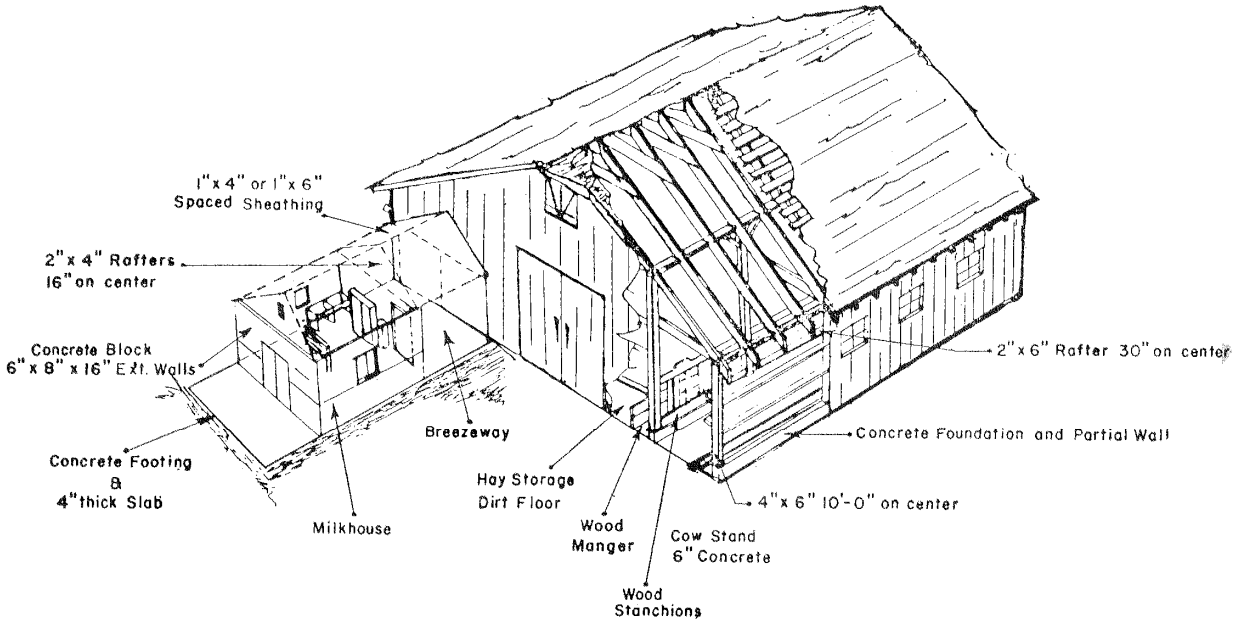
MILKING BARNS

Foundation	Light concrete
Floors	Concrete—cow stands
Walls	Box frame, 4" x 6"—10' on center
Roof	Average wood frame, wood shingles, corrugated iron, or aluminum cover
Windows	Barn sash
Interior	Unfinished
Electrical	None
Plumbing	None
Stanchions	Wood stanchions
Square-Foot Costs	**$14.10 to $17.60 per square foot**

Building costs do not include milking equipment

DAIRY BARNS

GRADE "B" BARNS



TYPICAL GRADE "B" DAIRY BARN

DAIRY BARNS

STANCHION BARNS

High end of range in cost is for Sacramento and Northern California

MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
Square-Foot Cost	**$35.30 to $42.50 per square foot (including breezeway)**

MILKING BARNS

Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
Square-Foot Cost	**$25.90 to $29.70 per square foot**

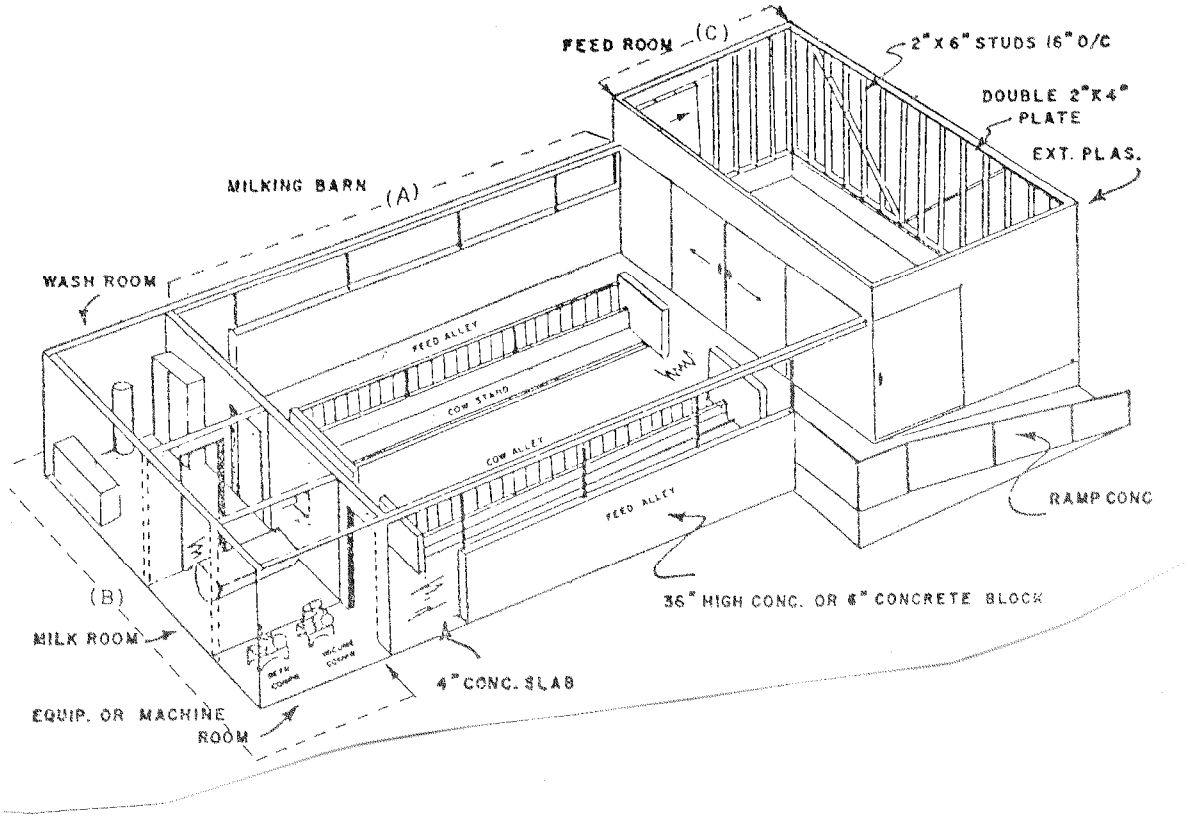
FEED ROOM

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	2" x 4" or 2" x 6"—16" on center framing
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	None
Interior	Unfinished
Electrical	Conduit—average fixtures
Plumbing	None
Square-Foot Cost	**$14.20 to $23.80 per square feet**

Building costs do not include milking equipment

DAIRY BARNS

STANCHION BARNS



Component Parts of This Dairy

A. Milking Barn
B. Feed Room
C. Milk, Wash, and Equipment Rooms

TYPICAL STANCHION BARN

DAIRY BARNS

WALK-THROUGH TYPE

High end of the range in cost is for Sacramento and Northern California

MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
Square-Foot Cost	**$29.70 to $32.00 per square foot (including breezeway)**

MILKING BARNS

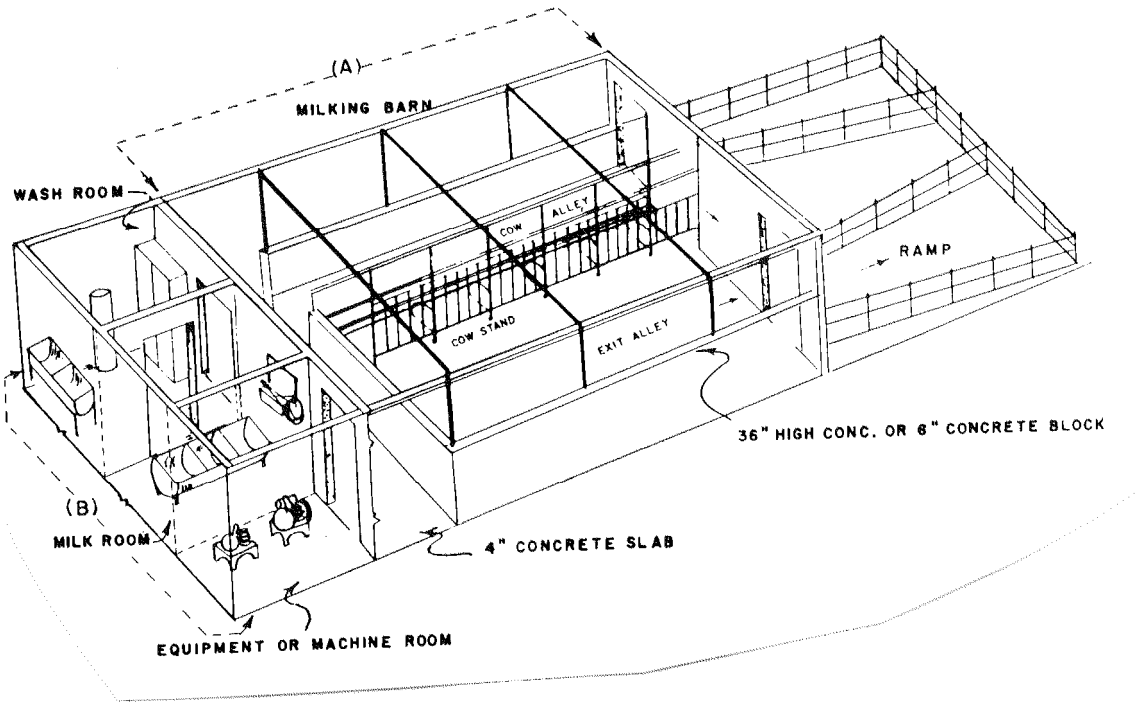
Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above, or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
Square-Foot Cost	**$28.60 to $31.00 per square foot**

Building costs do not include milking equipment

DAIRY BARNS

WALK-THROUGH TYPE

TYPICAL WALK-THROUGH BARN



Component Parts of This Dairy

A. Milking Barn
B. Milk, Wash, and Equipment Rooms

AH 534.30: POULTRY HOUSES

This section contains specifications and costs for various poultry structures and equipment including the following:

- Modern controlled environment houses
- Conventional lay cage houses
- Breeding barn

POULTRY HOUSES

MODERN CONTROLLED ENVIRONMENT HOUSES—GOOD QUALITY

Foundation	Concrete
Floor	Concrete slab
Wall Frame	Heavy steel beam, 20' to 22' to eave
Roof Frame	Steel truss and steel purlins, insulated
Exterior	26-gauge steel panels with R-11 insulation
Lighting	Good quality lighting
Plumbing	Good plumbing
Basic Building Cost Per Square Foot	**$21.00 to $23.00**

Typical Size 80' x 400'

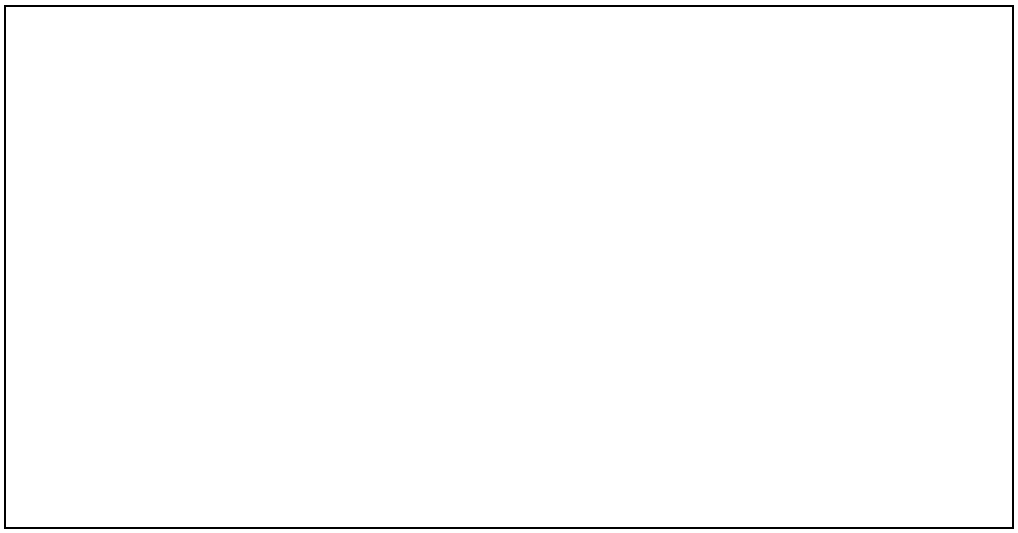
Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building cost to arrive at total cost.

TYPICAL CROSS SECTION

POULTRY HOUSES

EQUIPMENT - MODERN CONTROLLED ENVIRONMENT HOUSES

Components	A-Frame Cages
Cages	5 tier
Watering System	Automatic nipple system
Feeding System	Automatic auger system
Egg-Gathering System	Automatic
Cooling	Pad and fan system
Heating	None
Total Cost Per Bird Equipment	**$6.00 to $7.00 per bird**



A-FRAME CAGE SYSTEM

POULTRY HOUSES

CONVENTIONAL LAY CAGE HOUSES

Components	Fair Quality	Average Quality	Good Quality
Foundations	Wood piers	Concrete piers	Thickened slab
Floors	Dirt	Dirt with 4' concrete walkways	2" concrete
Frame	Light wood frame	Average wood frame	Light steel or average wood frame
Roof Cover	Light aluminum or composition	Light aluminum or composition	Aluminum or 28-gauge galvanized steel
Exterior	Wood lath	Vinyl curtains	Plywood
Lighting	Minimum system manual controls	Average system automatic controls	Good system, fluorescent automatic controls
Plumbing	Fair system	Average system	Good system
Insulation	None	None	Roof only
Basic Building Cost Per Square Foot	**$3.50 - $4.00**	**$4.50 - $5.65**	**$6.80 - $8.00**

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building costs to arrive at total cost.

POULTRY HOUSES

POULTRY HOUSE

Size: 50' x 450'—22,500 square feet
No foundation
Box construction, 4" x 6" posts on 10' centers
Plywood ends
Chicken wire siding with curtains
2" x 8" roof rafters on 10' centers
Roof cover—galvanized steel
Dirt floors
Plumbing and electric systems—extra

Cost: $3.75 - $4.00 per square foot

Same structure without chicken wire sides and curtain

Cost: $3.35 per square foot

BREEDING BARN

Size: 40' x 360'—14,400 square feet
Concrete foundation
Box construction, 6" x 6" posts on 10' centers—8' high
Exterior: wood siding on the ends and 4' on sides—4' chicken wires on sides, and curtains
2" x 8" roof rafters on 10' centers
Roof cover: 28-gauge galvanized steel
Concrete floors
Workroom on one end, 10' x 40'
Plumbing and electrical systems—extra

Cost: $4.85 per square foot

POULTRY HOUSES

PICTURES

BREEDING OR BROILER BARN

AH:534.61: IRRIGATION SYSTEMS

The following costs of irrigation system components have been tabulated from information gathered, for the most part, in the San Joaquin and Sacramento Valleys. Costs have been collected for only the more widely used components. Many areas will have types of equipment not usually found in other locations. These costs should be checked locally.

IRRIGATION SYSTEMS

CONCRETE PIPE—INSTALLED

Size in Inches	Cost Installed Per Lineal Foot		Vertical Stand Pipe Including Base Installed Cost Per Foot of Height	
	Fresno Area	Sacramento North	Fresno Area	Sacramento North
8	$6.35	$6.50	$15.00	$16.00
10	6.60	6.65	18.50	19.50
12	7.00	7.15	19.50	21.00
14	7.40	7.80	21.50	23.50
16	8.15	8.42	30.00	31.00
18	9.55	9.85	40.00	42.00
20	11.25	11.60	40.00	46.50
24	16.10	17.25	60.00	70.00
30	43.00	45.00	115.00	121.00
36	55.00		130.00	140.00
42			185.00	190.00
48			250.00	260.00

The above prices are for installations over 700 feet in length. Adjust the above prices for installations less than 700 feet by the following amount.

Length of Pipe	Add to All Sizes
Up to 100'	$6.25 per foot
100' to 200'	3.50 per foot
200' to 300'	3.25 per foot
300' to 400'	2.50 per foot
400' to 500'	1.90 per foot
500' to 600'	1.25 per foot
600' to 700'	.75 per foot

IRRIGATION SYSTEMS

PRESSURE BOXES (Reinforced concrete with capped top)

Size	Price Per Lineal Foot of Height
24"	$310
30"	425
36"	525

STAND PIPE INCLUDING THE BASE

Size	6'	9'	12'	15'
24"	$360	$ 540	$ 720	$ 900
30"	690	1,035	1,380	1,725
36"	780	1,170	1,560	1,950
42"	1,110	1,665	2,220	2,775
48"	1,500	2,250	3,000	3,750

VENT PIPE—PLASTIC

Size	9' Height Limit
2"	$ 7.00 per foot
3"	10.00 per foot
4"	13.00 per foot

VENT PIPE—STEEL

Size	9' Height Limit
2"	$10.00 per foot
4"	11.50 per foot
6"	16.00 per foot
8"	20.00 per foot
10"	25.00 per foot
12"	34.00 per foot

ADD HOOK-UP (When new concrete pipe is connected to old concrete pipe, add the following)

Size	Add
8", 10", and 12"	$250
14", 16", and 18"	300
20" and 24"	350

IRRIGATION SYSTEMS

P.V.C. PIPE

Cost includes components and installation, but not hook-up to pump. As pressure requirements rise, the pipe becomes more costly.

P.V.C. PIPE—INSTALLED (PER LINEAL FOOT)

Size	Class 63 Low Head (Flood)	100 P S I (Sprinkler)
6"	$3.80	$4.90
8"	4.75	6.00
10"	6.50	7.00
12"	8.00	9.00
15"	10.50	11.50
18"	15.00	16.25

P.V.C. hook-up to pump—includes relief valves, check valves, dresser couplings, elbows, and labor.

ADD HOOK-UP

Size	Cost
6"	$600
8"	680
10"	1,075
12"	1,550

VALVE, SADDLE, AND RISER (FOR SURFACE LATERALS)

Size	Sprinkler	Flood
4"	$ 75	$100
8"	-	175
10"	-	220
12"	-	300
14"	-	360

IRRIGATION SYSTEMS

ALUMINUM PIPE

Aluminum pipe costs include sales tax, but exclude installation costs due to their portable nature.

Main Lines Per Linear Foot	Diameter			
	6"	**8"**	**10"**	**12"**
Ring Lock Type				
40' joints without valve	$4.00	$5.35	$6.20	$7.30
40' joints with valve	4.50	6.30	7.35	8.70
Latch Type	**3"**	**4"**	**6"**	
30' joints without valve	$1.22	$2.10	$3.00	

SPRINKLER LINES

18" Risers—30' lengths 3"—$1.65 per linear foot 4"—$2.30 per linear foot

FITTINGS

Valve Openers		End Plugs		Elbows	
Size	**Cost**	**Size**	**Cost**	**Size**	**Cost**
3"	$70	6"	$40	6"	$ 76
4"	71	8"	50	8"	100
		10"	75	10"	140

IRRIGATION SYSTEMS

IRRIGATION VALVES

Flood valves are set near the top or flush on top of a concrete pipe riser. Several types are in general use, i.e., Yakima and Alfalfa. They are made with either a solid arch or a removable arch. The removable arch type is more expensive, but it allows for replacement of the arch without complete valve removal when breakage occurs. The solid arch is usually found to be a Yakima and the removable arch is an Alfalfa.

FLOOD VALVES

Size in Inches	Solid Arch Yakima	Size in Inches	Alfalfa
3 x 8	$ 75		
4 x 8	78	8 x 8	$ 150
5 x 8	85	10 x 10	190
6 x 10	110	12 x 12	225
8 x 12	135	14 x 14	260
10 x 14	180	16 x 16	350
12 x 16	225	18 x 18	475
14 x 18	275	20 x 20	590
16 x 20	425	24 x 24	875
18 x 20	460		
20 x 20	550		

OVERFLOW VALVES

Size in Inches	Cost Installed
3 x 8	$ 70
3 1/2 x 8	70
4 x 8	72
5 x 8	82
5 x 10	82
6 x 10	110
6 1/2 x 10	110
8 x 12	130
10 x 14	180
12 x 16	235
14 x 18	290
16 x 20	420
18 x 20	515
20 x 24	650

IRRIGATION SYSTEMS

IRRIGATION VALVES

The orchard valve is a solid arch set down in a riser. Although it is generally used in orchards, it may also be found in row crops and pastures.

ORCHARD VALVE

Valve Size	Riser Size	Cost
3 1/2"	8"	$ 65
4"	8"	82
5"	8"	82
6"	10"	106
6 1/2"	10"	110
8"	12"	126
10"	14"	175
12"	16"	225
14"	18"	264
16"	20"	390
18"	21"	490
20"	24"	590

IRRIGATION SYSTEMS

IRRIGATION VALVES

The vineyard valve is a modification of the orchard valve. The riser is pierced with two or more small galvanized tubes which have small sliding galvanized gates. This arrangement allows a choice of direction and volume of water flow. This valve is found mainly in the Central San Joaquin Valley.

VINEYARD VALVE

Valve Size	Riser Size	Number of Gates	Gate Size	Cost Installed
3 1/2"	8"	2	2"	$74
3 1/2"	8"	2	2 1/2"	76
3 1/2"	8"	2	3"	78
3 1/2"	8"	3	2"	80
3 1/2"	10"	2	2"	76
3 1/2"	10"	2	2 1/2"	78
3 1/2"	10"	2	3"	78
4"	8"	2	2"	76
4"	8"	2	2 1/2"	79
4"	8"	2	3"	81
4"	10"	2	2"	79
4"	10"	2	2 1/2"	81
4"	10"	2	3"	85
4"	10"	3	2"	85
4"	10"	4	2"	85
5"	10"	4	2"	105
5"	12"	2	3"	103
6"	10"	2	3"	92
6"	10"	4	3"	106
6"	12"	2	3"	110
6"	12"	2	4"	115

IRRIGATION SYSTEMS

IRRIGATION VALVES

Gate valves have different designs depending on the use. The canal gate is for general low-pressure uses as canal discharges, pressure pipelines, etc. The screw-pressure gate is a high-pressure gate valve used for reservoirs, etc. The hub-end gate is designed for use in pipelines.

GATE VALVES

Size in Inches	Screw Pressure	Canal Gate	Hub-End Gate	Clamp Gate	Baxter Gate	Galva-nized Gate	*Brass Slide Gate	*Cast Iron Gate
6						$70		
8	$560		$970	$390		99		$105
10	630	$ 650	1,180	450		108	$315	130
12	720	700	1,300	500	$1,050	124	340	145
14	920	820	1,600	660		154	350	210
16	1,480	990	2,000	800	1,300	179	420	315
18	1,990	1,100	2,600			195	550	
20	2,050	1,280	3,000			220	630	
24	2,600	1,500				300	760	

* Brass-Slide and Cast-Iron Gates are seldom used.

Capped riser irrigation systems are generally found in old orange groves. The galvanized gates are diamond shaped.

CAPPED RISERS

Size	Number of Gates	Size of Gates	Installed Cost
8"	2	2"	$44
8"	3	1"	45
8"	4	1"	51

AIR RELIEF VALVES

Size	Installed on PVC	Installed on Concrete Pipe
2"	$115	$140
3"	190	220
4"	250	320

IRRIGATION SYSTEMS

PERMANENT IRRIGATION SYSTEM

The larger set-ups are at lower end of range

SPRINKLERS— "SOLID SET"—UNDER TREES

Type	Cost Per Acre
Manual System	$ 900 to 1,200
Automatic System	1,000 to 1,500
Frost Protection System	1,000 to 1,500
Automatic system with frost protection	1,400 to 1,800

P.V.C. underground lines, 12" risers, impulse heads, sand filter

SPRINKLERS—"SOLID SET"—OVER VINES

Type	Cost Per Acre
Manual System	$ 800 to $1,100
Automatic System	$ 900 to $1,200
Frost Protection System	$1,100 to $1,400
Automatic system with frost protection	$1,600 to $2,400

P.V.C. underground lines, 6" risers, impulse heads, sand filter

DRIP SYSTEM—ORCHARD

Type	Cost Per Acre
New planting (1 to 4 emitters per tree)	$ 800 to $1,300
Mature orchard (4 emitters per tree)	$ 900 to $1,300

DRIP SYSTEM—VINEYARD

Type	Cost Per Acre	Total Cost
Ratio of cost—70 percent above ground, 30 percent below ground, add	$950 to $1,400	
Elaborate sand filters (for dirty water-aqueduct and river water), add	$100 to $120	
Fertilizer application equipment, add		$750 to $900
When proportion pumps are used, add		$1,350 to $2,200

The linear overhead sprinkler system is used on a level parcel usually a one-half section of land. A concrete ditch runs through the parcel as a water supply. This type of irrigation system costs between **$650 to $750** per acre. The linear drive machine costs **$120,000 - $140,000**.

IRRIGATION SYSTEMS

PERMANENT IRRIGATION SYSTEM

PULL HOSE SYSTEM

Type	Cost Per Acre
Plus pump and filter	$550 to $700

ELECTRIC CENTER PIVOT SPRINKLER—Including concrete base

Size	Cost Each
160 acres (130 acres net)	$40,000 to $45,000
160 acres (130 acres net) – Used 12-15 years	$16,000 to $19,000

CONCRETE PIPE POURED IN-PLACE[1]

Size in Inches	Cost Per Linear Foot
30	$12.90
36	13.90
42	18.40
48	21.60

Concrete Structures	**$400** per cubic yard
Control Gates	**$200**
Hook-up and Connections	Between no charge and **$240**

CRIBBINGS

Size in Inches	Cost Per Linear Foot
24	$135
30	185
36	200

The concrete riser above the valve is cut in half to direct the flow of water

[1] This pipe is installed using a two-pour system. Monolithic pipe is installed by a single-pour system. Monolithic pipe is two to three times greater in cost.

IRRIGATION SYSTEMS

CONCRETE DITCH COSTS

Costs are for one-half to one mile runs. Shorter runs are a little higher.

Bottom	Depth	Cost Per Foot
1'	16"	$6.85
1'	18"	7.15
1'	20"	7.50
1'	22"	8.00
1'	24"	8.20
1'	26"	8.60
1'	28"	8.90
1'	30"	9.30
2'	24"	12.00
2'	27"	12.40
2'	30"	13.80
2'	34"	14.90
2'	36"	15.40
2'	38"	16.00
2'	40"	16.50
2'	42"	17.10
2'	44"	18.20
2'	46"	18.80
2'	48"	20.40

The above costs do not include end gates and turn out gates. They range from **$100 to $125** each (three joints 12" x 14" in diameter). Check gates cost **$340**.

The above prices do include the land shaping.

IRRIGATION SYSTEMS

ALFALFA VALVE **YAKIMA VALVE**

PRESSURE SLIDE GATE **CANAL GATE** **HUB END GATE**

IRRIGATION SYSTEMS

PICTURES

IN-LINE OVERHEAD SPRINKLER SYSTEM

IRRIGATION SYSTEMS

PICTURES

PIVOTAL OVERHEAD SPRINKLER

AH 534.62: PUMPS

This section contains specifications and costs for various pumps used with irrigation systems, including:

- Turbine pumps
- Diesel powered pumps
- Wells
- Windmills

PUMPS

SAN JOAQUIN VALLEY BASE TURBINE
3-PHASE FREE FLOW DISCHARGE

1,800 RPM, 5 to 350 HP installed, including pump complete in place with normal stages, power pole, pads, and control panel. Well and casing excluded.

	Depth of Setting											
HP	**40'**	**60'**	**80'**	**100'**	**120'**	**140'**	**160'**	**180'**	**200'**	**220'**	**260'**	**300'**
5	6,640	6,720	7,645	8,120	9,360							
8	6,720	6,860	7,960	8,485	10,150	10,920	12,100	12,955	14,855			
10	7,020	7,960	8,890	9,670	10,610	11,070	12,315	13,270	14,195	15,125	17,010	
15	7,960	8,740	9,670	10,455	10,920	11,245	12,630	13,655	14,820	15,755	17,935	19,655
20	9,685	10,290	11,070	11,550	12,095	12,630	13,270	13,880	14,985	16,225	18,105	19,820
25	10,290	10,610	11,550	12,800	13,270	13,720	14,520	15,910	17,010	17,935	18,410	20,280
30	11,550	12,160	12,630	13,420	14,045	14,820	15,610	16,385	17,160	18,105	19,510	21,070
40	12,795	13,100	13,420	14,195	15,900	16,845	17,790	18,730	19,665	20,280	22,620	24,190
50	13,270	14,820	16,380	17,160	17,940	18,730	19,510	20,280	22,620	23,405	26,515	28,075
60		17,150	17,935	19,510	20,280	21,070	21,850	22,620	24,185	26,520	29,640	31,200
75		19,510	20280	22,620	23,405	24,190	24,970	26,515	28,075	29,640	34,335	35,880
100		20,290	22,620	24,190	26,515	28,090	29,650	31,205	31,985	33,550	35,880	37,440
125		24,190	26,515	28,075	29,640	31,205	33,550	35,110	37,685	40,570	43,695	45,250
150			28,075	29,310	31,210	33,550	35,880	37,445	39,010	42,905	46,810	48,370
200			29,640	31,210	34,340	39,010	40,570	43,695	45,250	48,375	53,045	54,610
250						46,810	48,370	49,960	53,045	56,170	57,730	62,410
300						54,610	56,170	59,305	62,410	63,975	67,090	68,660
350						65,860	67,090	68,660	71,775	73,320	74,890	78,015

Note: The appraiser must know the horsepower and depth of setting in order to estimate the RCN from the chart.

Turbine pumps are more commonly used than submersibles, primarily due to accessibility of the pump for maintenance purposes. Submersibles tend to exceed the cost of turbines at high settings and tend to be less costly at lower settings.

Add 10 percent to the above RCN factors for irrigated sprinkler systems.

PUMPS

DIESEL POWERED DEEP WELL IRRIGATION PUMPS

The complete installation costs are divided into three parts: engines, gear heads, and below ground assembly. Costs are based on data from Fresno to the Southern San Joaquin Valley.

DIESEL ENGINES NEW (Includes Tax and Delivery)

HP	Cost
75 – 100	$8,000 - $10,500
100 – 150	$10,500 - $14,200
150 – 200	$13,300 - $17,000
200 – 250	$17,000 - $20,250
250 – 300	$20,250 - $23,750
300 – 400	$23,750 - $31,000

Reconditioned engines deduct 25 to 30 percent

GEAR HEADS

HP	DRIVE	SHAFT	FLANGES (2)	GUARD	LABOR	TOTAL
100	$2,080	$570	$315	$160	$1,560	$4,680
125	$2,250	$675	$420	$160	$1,560	$5,070
150	$2,750	$675	$420	$160	$1,560	$5,555
200	$3,370	$675	$420	$160	$1,560	$6,175
250	$5,600	$1,040	$520	$160	$1,560	$8,725
300	$6,180	$1,040	$520	$160	$1,560	$9,450
350	$7,300	$1,040	$520	$160	$1,560	$10,575
400	$8,990	$1,150	$520	$160	$1,560	$12,365

BELOW GROUND ASSEMBLY (Includes Column—Tube and Shaft and Bowls)

Gear Head HP	200' Lift	300' Lift	400' Lift	500' Lift	600' Lift	700' Lift
100	$16,883	$20,253				
125	$21,642	$25,320	$28,132			
150	$23,849	$28,132	$29,479			
200		$30,383	$32,069	$34,324		
250			$34,211	$36,460	$38,711	
300				$37,920	$40,160	$42,421
400				$39,608	$41,858	$45,233

Add to engine and gear head figures.

RULE OF THUMB: The horsepower of the gear head will require an engine with bulk or gross horsepower of about 1-1/2 times the size of the gear head, i.e., 200 HP gear head x 1.5 = 300 HP engine. 300 bulk HP engine x 80 percent = continuous HP x 80 percent = 192 HP to gear head.
NOTE: Costs do not include fuel tanks or fuel tank saddles.

PUMPS

PICTURES

TURBINE PUMP

DIESEL ENGINE
WITH GEAR HEAD DRIVE

PUMPS

DISCHARGE HEADS

Discharge Size	Price Includes Head, Solenoid, Oiler, Column, Nipple, and Flange
4 x 12	$1,225
6 x 12	1,475
8 x 12	1,530
8 x 16 1/2	1,890
10 x 20	2,350

COLUMN ASSEMBLY (In 20' lengths)

Column	Tube	Shaft	Price Per Foot
4"	1 1/2"	1"	$28.50
6"	2"	1 1/4"	40.00
8"	2 1/2"	1 1/2"	49.00
10"	2 1/2"	1 11/16"	58.00
10"	3"	1 15/16"	64.00
12"	3"	1 15/16"	69.00
12"	3 1/2"	2 1/4"	78.00

NOTE: Column assembly in 10' lengths—add 10 percent.

Reduce the above costs 15 percent for the San Joaquin Valley.

PUMPS

BOWLS

Stages	8"	10"	12"	14"	16"
1	$1,320	$1,560	$2,045	$3,005	$4,265
2	1,385	1,925	2,522	3,665	4,805
3	1,685	2,285	3,245	4,445	7,445
4	2,045	2,760	3,785	5,165	7,565
5	2,525	3,120	4,565	6,310	9,370
6	2,640	3,665	5,045	7,325	10,570
7	2,885	4,090	5,650	8,350	12,015
8	3,120	4,565	6,310	9,370	13,215
9	3,545	5,090	7,090	10,090	14,775
10	3,785	5,290	7,570	11,115	16,155
11	4,145	5,770	8,225		
12	4,565	6,310	8,830		
13	4,805	6,785			
14	5,045	7,210			
15	5,530	7,565			

Reduce the above costs 10 percent for the San Joaquin Valley

5 HP	to	7 1/2 HP	Use 8" bowls
10 HP	to	20 HP	Use 10" bowls
25 HP	to	60 HP	Use 12" bowls
75 HP	to	350 HP	Use 14" bowls up to 150' setting

8" bowls—25' per stage (100' = 4 stages)
10" bowls—35' per stage (100' = 3 stages)
12" bowls—50' per stage (100' = 2 stages)
14" bowls—60' per stage (100' = 2 stages)

PUMPS

CENTRIFUGAL BOOSTER PUMPS

Size	Cost
10 H.P.	$2,950 - $3,350
20 H.P.	$3,650 - $4,250
30 H.P.	$4,400 - $4,700
40 H.P.	$5,000 - $5,450
50 H.P.	$6,000 - $6,500
60 H.P.	$7,100 - $7,600
80 H.P.	$8,000 - $8,400
100 H.P.	$8,600 - $9,000

TURBINE BOOSTER PUMPS

Size	Cost
40 H.P.	$6,800
50 H.P.	$7,400
60 H.P.	$8,650
75 H.P.	$9,500
100 H.P.	$10,290
125 H.P.	$13,100
150 H.P.	$14,700

PUMPS

SUBMERSIBLE

Costs are based on 3-phase, 3,600 RPM pump in a 6" to 18" well. They include normal stages, check valve, power pole, control panel, and installation labor at 0' setting. Costs are relative to settings—low for shallow, high for deep—for installations typical to the horsepower. Add riser pipe and wire costs per linear foot to setting depth. Add well and casing.

HP	Motor, Pump, and Stages	Column Assembly	Recommended Well Size
5	2,600 to 3,000	$5.50 to $7.40	8"
7 ½	3,000 to 3,500	$5.50 to $11.20	8"
10	3,500 to 3,900	$5.50 to $12.20	8" to 10"
15	4,000 to 4,700	$6.90 to $13.50	10" to 12"
20	4,900 to 5,500	$8.00 to $14.30	12"
25	5,200 to 5,800	$10.00 to $14.40	12"
30	7,000 to 7,700	$10.00 to $15.65	12"

High capacity—1,760 RPM (little used) for deep wells. Cost includes pump end and one stage, control panel, power pole, tax, and installation labor.

HP	Motor and Pump	Stages	Riser Pipe and Wire Per Foot	Recommended Well Size
40	$10,500 +	$340 per stage	$18.55	12"
50	11,500 +	410 per stage	23.20	14"
60	12,400 +	450 per stage	23.20	14"
75	13,200 +	460 per stage	23.20	14"
100	14,200 +	480 per stage	23.20	14"

TAIL WATER PUMPS

HP	Cost	HP	Cost
2	$3,400	20	$6,600
3	3,600	25	7,100
5	3,900	30	7,400
7 ½	4,300	40	8,200
10	4,600	50	9,000
15	5,900		

PUMPS

WELL COSTS

REVERSE ROTARY DRILLING
(Includes Casing, Gravel Pack, Cement Seal, Development of Well)

Size	To 700'	Over 700'	Over 1,000'
6" 12 ga.	$23	$37	
6" 10 ga.	28		
8" 12 ga.	35		
8" 10 ga.	40		
8" 3/16 in.	44	44	
10" 10 ga.	46		
10" 3/16 in.	50		
10" 1/4 in.	55	65	
12" 10 ga.	55		
12" 3/16 in.	60		
12" 1/4 in.	68	75	$98
14" 3/16 in.	73		
14" 1/4 in.	80	92	
14" 5/16 in.	86	100	113
16" 3/16 in.	76		
16" 1/4 in.	85		
16" 5/16 in.	94	115	120
18" 3/16 in.	90		
18" 1/4 in.	100		
18" 5/16 in.	115	125	147
20" 3/16 in.	100		
20" 1/4 in.	112		
20" 5/16 in.	120	150	180

Cable Tool Drilling	Cost Per Foot of Depth
6"	$20 - $25
8"	$24 - $28
10"	$28 - $33
12"	$41 - $53
14"	$45 - $58
16"	$55 - $65
18"	$64 - $84

State Law requires 20' seal in all well shafts.

6"	$450
8"	450
10"	650
12"	650
14"	750
16"	750
18"	750

PUMPS

WINDMILLS

COST INSTALLED

Wheel or Fan Diameter	Weight (Pounds)	Cost	Installation	Total
6' mill	200	$2,300	$1,150	$3,450
8' mill	370	2,600	1,150	3,750
10' mill	660	3,660	1,350	5,010
12' mill	1,100	5,200	1,600	6,450
14' mill	1,700	7,500	1,800	9,300
16' mill	2,500	9,900	2,200	12,100

TOWER REQUIREMENTS FOR FAN SIZE IN DIAMETER

	Windmill Size				
Tower Height	6' - 8' Fan	10' Fan	12' Fan	14' Fan	16' Fan
21'	$1,465	$1,555			
27'	1,686	2,110	$2,415	$2,625	
33'	1,938	2,230	2,654	3,057	$4,105
40'	2,400	2,633	3,116	3,359	4,708
47'	2,692	3,135	3,660	4,712	5,614

Windmill installation costs are determined by the following:

- Tower height
- Fan diameter
- Force pump: size and diameter
- Cylinder: size and type
- Pipe: size and length
- Rod: material, size and length.

Force pump, cylinder pipe, rod, and miscellaneous costs range from **$750 to $2,100**.

Example

10' Fan	$5,010
33' Tower	2,230
Force Pump, Cylinder Pipe, Rod and Miscellaneous Costs	1,300
	$8,540

Refurbished Windmill: Deduct 35 to 40 percent from above prices.

PUMPS

WINDMILLS

WATER STORAGE TANKS

GALVANIZED COVERED STORAGE TANKS

Gallons	Diameter	Height	Gauge	Weight (Pounds)	Price
1,044	6' 8"	48"	12	670	$ 1,150
1,504	8' 10"	48"	12	912	1,390
1,900	6' 4"	96"	12	1,014	1,450
2,500	7' 4"	96"	12	1,321	1,830
2,880	7' 10"	96"	12	1,329	1,950
3,200	8' 3"	96"	12	1,423	2,100
3,500	8' 8"	96"	12	1,520	2,240
4,200	9' 5 1/2"	96"	12	1,724	2,760
5,000	10' 4"	96"	12	1,924	2,960
5,500	10' 10"	96"	12	2,080	3,280
6,000	11' 4"	96"	12	2,163	3,400
6,500	11' 10"	96"	12	2,210	3,640
7,500	10' 4"	12'	12	2,553	3,960
8,600	9' 7"	16'	12	2,856	4,360
10,000	9' 9"	18'	12	3,169	5,050
12,000	10' 2"	20'	12	3,667	5,750
15,000	11' 11"	18'	10	5,376	7,560
17,500	11' 2"	24'	10	5,995	8,360
20,000	11' 11"	24'	10	6,480	9,780
25,000	18' 10"	12'	10	7,320	11,800
30,000	20' 9"	12'	10	8,500	13,380

Tanks should be set on a level foundation of ¾" crushed rock that is 4" to 6" deep.

AH 534.71: CORRALS AND FENCES

This section contains various costs associated with corrals and fences. Specifications and costs are included for:

- Steel fencing
- Barbed wire fencing
- Wood fencing
- Wood gates
- Metal gates
- Metal panels
- Vinyl/P.V.C. fencing
- Cattle squeeze

CORRALS AND FENCES

STEEL FENCING

Height and Type	Fence Cost Per Lineal Foot	Additions
11 Gauge		
3' chain link	$5.50	Top Rail: $1.40 per lineal foot
4' chain link	6.50	
5' chain link	7.90	Barbed wire, 3 strands:
6' chain link	9.50	$1.90 per lineal foot
8' chain link	12.00	
10' chain link	14.80	Barbed coils: $6.80 per
12' chain link	17.50	lineal foot
9 Gauge		
3' chain link	$6.40	Barbed wire, 3 strands:
4' chain link	6.90	$2.00 per lineal foot on
5' chain link	8.10	10' and 12' fence
6' chain link	9.80	
8' chain link	12.90	
10' chain link	16.50	
12' chain link	19.50	

BARBED WIRE FENCING

Size and Type	Per Lineal Foot/1 Mile or More
Barbed wire, 3 strand	$2.00 to $2.45
Barbed wire, 4 strand	$2.20 to $2.65
Barbed wire, 5 strand	$2.40 to $2.90
2 strands barbed, 32" woven wire, steel posts	$3.50 to $3.90

Fence costs are complete—fencing and posts. Gates are to be added. Do not deduct fence for gates. Posts are set in concrete on 10' centers.

CORRALS AND FENCES

WOOD FENCING—COST PER LINEAL FOOT

Rail Size	Post Size	Number of Rails			
		1	2	3	6
2" x 8"	6" x 6"	$6.40	$7.40	$9.50	$12.00
2" x 6"	6" x 4"	4.93	5.37	5.81	7.12
2" x 4"	6" x 4"	4.78	5.06	5.34	6.40
1" x 8"	6" x 4"	4.60	5.20	5.50	6.40
1" x 6"	6" x 4"	4.30	4.70	5.30	6.10
1 ¼" x 6"	6" x 4"	4.50	4.50	5.55	6.60
2" x 6"	4" x 4"	4.43	4.87	5.30	6.40

All posts figured at 8' on center.

WOOD GATES—COST PER GATE

Height/ Description	Width						
	4'	6'	8'	10'	12'	16'	20'
4' 5 Rails	$50	$64	$81	$156	$162	$178	$190
5' 6 Rails	63	75	121	169	182	196	209
6' 7 Rails	75	87	174	185	202	213	230

METAL GATES (INCLUDING POSTS)—COST PER GATE

Height/ Description	Width					
	3'	4'	10'	12'	14'	16'
4' 1 3/8" Galvanized Tube Galvanized Fabric Including Hardware	$68	$74	$126	$137	$158	$173
5' 1 5/8" Standard Pipe Fabric Including Hardware	120	137	210	242	263	294
6' 1 5/8" Standard Pipe Fabric Including Hardware	130	147	242	273	305	336

CORRALS AND FENCES

METAL GATES

5-BAR ADJUSTABLE GATES—5' IN HEIGHT

Size	Cost Per Gate
3' to 4'	$ 78.00
4' to 6'	88.00
6' to 8'	112.00
8' to 10'	126.00
10' to 12'	137.00
12' to 14'	163.00
14' to 16'	194.00
16' to 20'	245.00

6-BAR ADJUSTABLE GATES—5' IN HEIGHT

Size	Cost Per Gate
3' to 4'	$ 86.00
4' to 6'	100.00
6' to 8'	127.00
8' to 10'	143.00
10' to 12'	154.00
12' to 14'	184.00
14' to 16'	195.00
16' to 20'	240.00

5-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

Size	Cost Per Gate
8' to 10'	$111.00
10' to 12'	127.00
12' to 14'	136.00
14' to 16'	158.00
16' to 18'	177.00
18' to 20'	191.00
20' to 22'	204.00
22' to 24'	218.00
24' to 26'	224.00

Add for the hinge and latch posts - **$35 to $40**

CORRALS AND FENCES

METAL PANELS

6-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

Size	Cost Per Gate
8' to 10'	$126.00
10' to 12'	140.00
12' to 14'	154.00
14' to 16'	178.00
16' to 18'	192.00
18' to 20'	218.00
20' to 22'	229.00
22' to 24'	246.00
24' to 26'	255.00

3-BAR FENCE PANEL

Size	Cost Per Gate
10'	$ 70.00
12'	82.00
16'	95.00
18'	101.00
20'	113.00
24'	126.00

PORTABLE LOADING CHUTE

Size	Cost Per Gate
30" x 5' High	$1,000

5-BAR SOLID PANEL

Size	Cost Per Gate
10'	$100.00
12'	111.00
16'	147.00
18'	157.00
20'	170.00
24'	191.00

6-BAR SOLID PANEL

Size	Cost Per Gate
10'	$ 112.00
12'	126.00
16'	167.00
18'	174.00
20'	193.00
24'	221.00

CORRALS AND FENCES

VINYL/P.V.C. FENCING (White)

Post Size	Rail Size	Number of Rails	Cost Per Lineal Foot Installed
5" x 5"	1-1/2" x 5-1/2" x 16'	3	$9.00
5" x 5"	1-1/2" x 5-1/2" x 16'	4	$9.75

Prices based on 1,000' +

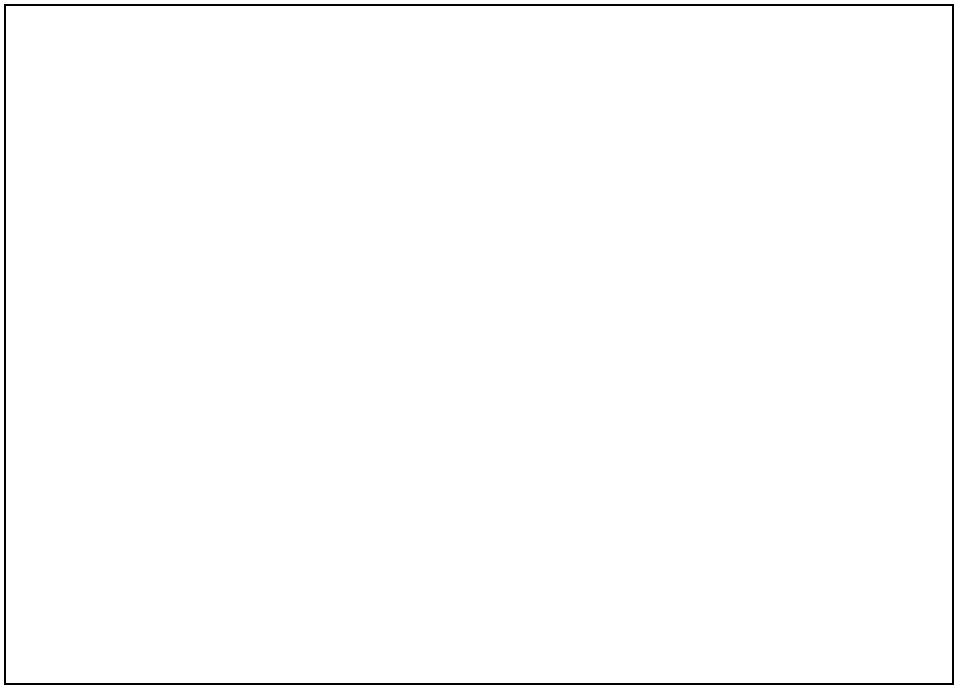
Height: 54 inches or 6 1/2 feet

Posts: Set in concrete—10" diameter, 30" deep, 8' on center

Gates: 12' Metal gates (preferred)—$**650** installed, plus paint

12' P.V.C. gates (have tendency to sag)—$**1,000** installed

Color: Add 10 percent



CORRALS AND FENCES

CATTLE SQUEEZE

Hydraulic Metal	$5,000
Upright Metal	$1,800 to $2,000
Upright Metal Extended	$1,950 to $2,100
Calf Chute or Table	$850

AH 534.75: GREENHOUSES

This section contains specifications and costs for greenhouses. Commercial greenhouses are constructed with steel or wood posts and trusses on 10' ± centers. Some of the greenhouses have a polycarbonate, fiberglass cover, glass cover, or a polyethylene plastic cover. The span of the truss is generally 20 to 40 feet.

- Some greenhouses are constructed as Quonset design metal ribs and fiberglass cover.
- Wall heights vary from 7 feet to 10 feet on the straight wall construction.

GREENHOUSES

BUILDING SPECIFICATIONS

Components	Low Quality	Average Quality	High Quality
Wall and Roof	Light pipe, 4' wall, single light polyethylene cover, fiberglass ends	Galvanized steel frame, 8' wall, double polycarbonate or fiberglass cover	Heavy steel frame, 8' wall, glass or multi-wall polycarbonate cover
Floor	Dirt—some gravel	Gravel—some concrete walks	Adequate concrete walks, concrete foundation
Interior	No lighting, minimum water	Average lighting, water, and roof vents	Ample lighting, water, roof vents, and exhaust fans

SQUARE-FOOT COSTS

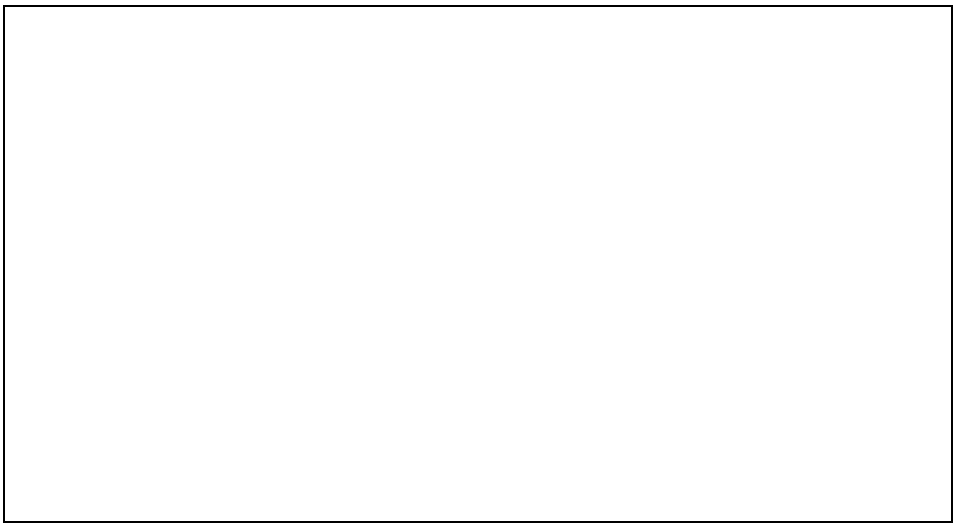
	Square-Foot Area					
Quality	**3,000-5,000**	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**
Low	$3.20	$2.85	$2.75	$2.65	$2.35	$2.15
Average	13.30	12.48	10.60	10.00	9.60	9.25
High	17.70	16.60	14.50	13.70	12.80	12.50

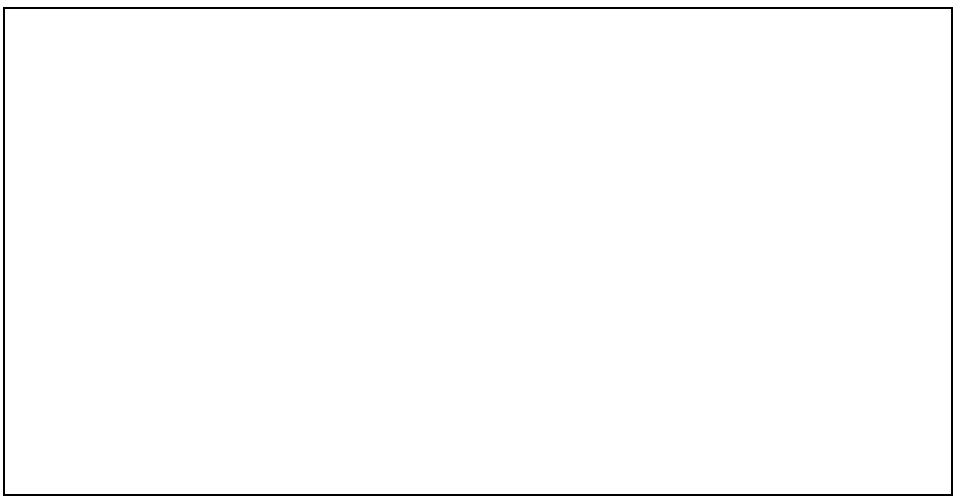
ADDITIVES

Additional concrete walk	$2.60 to $2.85 per square foot
Benching	$2.50 to $3.00 per square foot—average quality
Gravel floor	$.30 - $.33 per square foot

GREENHOUSES

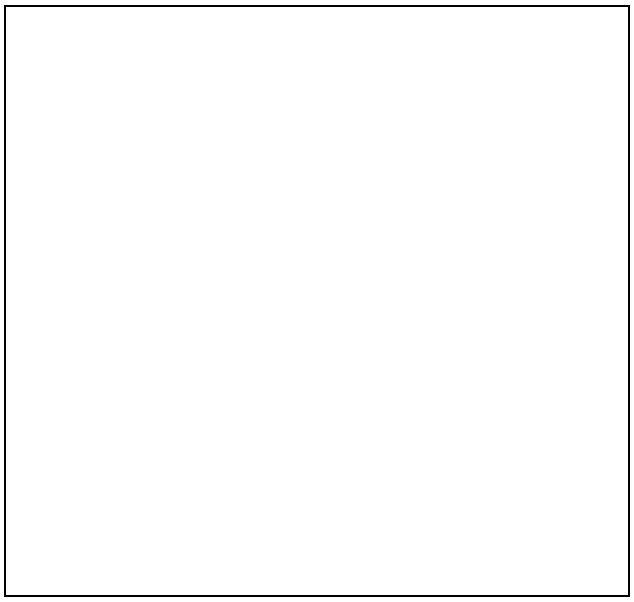
CLIMATE CONTROL

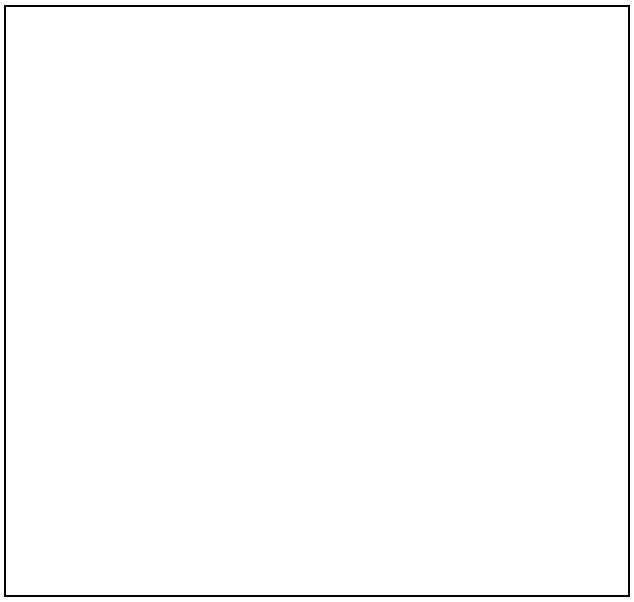




GREENHOUSES

GREENHOUSE FRAMING





GREENHOUSES

SHADE CLOTH HOUSES

FAIR TO LOW COST

Wood or steel post construction, no walls. Overhead cable support with wire, covered by a flat shade fabric normally 7' to 9' high. The following costs are with a dirt floor.

Square-Foot Area	Cost Per Square Foot
Under 10,000	$1.20
10,000 – 20,000	$.93 - $.98
20,000 – 40,000	$.85 - $.93
40,000 Up	$.79 - $.82

ADDITIVE

Gravel Floor $.30 per square foot

AH 534.76: LAND DEVELOPMENT AND DRAINAGE TILE

LEVELING COST

Item	Per Acre
Native Land	$350 - $700
Ripping and Relieving	$380 - $580
Touch-Up Leveling—Laser	$100 - $125
Rescaping	$60 - $80

EARTH MOVING

Size	Cost
Per cubic yard	$.55 - $.65

RIPPING

Item	Cost
Clay 5' deep	$325 - $375
Clay 6' deep	$350 - $400
Loamy or sandy soil	$225 - $275
Hard pan 4' - 6' deep	$350 - $650

NOTE:

1. Ripping costs are based on four-foot centers.
2. Ripping cost with a slip plow attached to shank (superior mixing and breaking of soils) is typically done on six-foot centers, and the cost is equal to standard ripping on four-foot centers.
3. Typically takes ten hours to rip seven acres on four-foot centers.

LAND DEVELOPMENT AND DRAINAGE TILE

Recent drainage tile installations use corrugated plastic tubing. The spacing varies from 100 feet to 400 feet on centers. The older type installation includes perforated tile with wide trenches. A 5-inch corrugated plastic drain tubing is installed in a 12-inch trench versus a 24-inch to 27-inch trench for the older type installation. The cost for gravel fill is much less because of the narrower trench.

The cost installed of 5-inch corrugated plastic tubing on 400-foot centers, 7 1/2-feet deep including sump and pump, and trench width of 12 inches with gravel fill over the pipe is as follows.

DRAINAGE TILE

Loamy Soils	$465 per acre
Rocky Soils	$630 per acre

Reduce the above cost 25 percent if system lacks a pump or sump.
Increase the above cost 25 percent if the system has 100-foot centers, with 4-inch lines.

TILE COSTS - INSTALLED

Includes trenching and perforated pipe packed in 3" pee gravel

Pipe Size	Cost
4"	$2.25
5"	2.50
6"	2.75
8"	3.55
10"	5.25
12"	6.50
15"	9.00

The above costs are for a standard system on level accessible soil. Costs are higher for undulating and remote farmland.

AH 534.77: VINEYARD STAKES AND TRELLISES

Vineyard stakes and trellises costs vary due to the following:

- Type and quality of material
- Spacing between the rows of vines
- Spacing between the vines within the rows
- Kind of vineyard
- Cost of labor (farm labor or commercial contractor)

This section contains costs on the following:

- Table Grape Trellises
- Raisin Grape Trellises
- Wine Grape Trellises
- Miscellaneous vineyard components

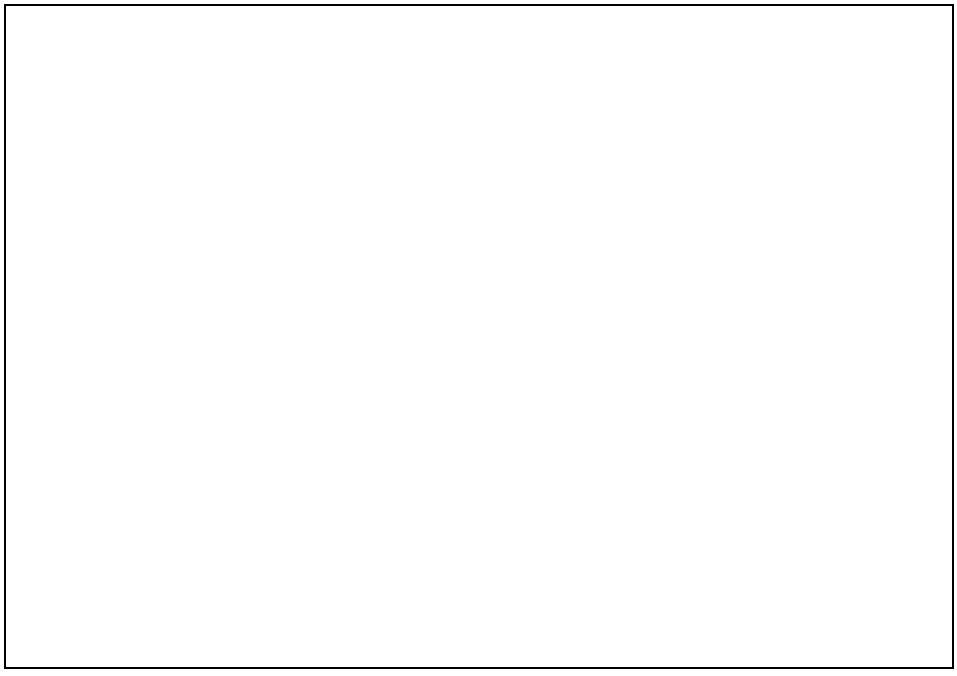
Sun Maid Southside Dry on Vine Trellis

VINEYARD STAKES AND TRELLISES

TABLE GRAPES

SINGLE CROSSARM

Seven-foot stake and 36" to 42" crossarm with four wires (13-gauge)



VINEYARD STAKES AND TRELLISES

TABLE GRAPES

SINGLE CROSSARM

10 FOOT ROWS

	Spacing—6' x 10' or 7 ' x 10' or 8' x 10'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$5.15		
Every 15 feet	$5.15	290	$1,493
Every 18 feet	$5.15	242	$1,246
Every 21 feet	$5.15	207	$1,066
Every 24 feet	$5.15	182	$937
Four wires			$384
End post with anchor (installed)	$26.00	14	$364
End post without anchor (installed)	$18.00	14	$252

11 FOOT ROWS

	Spacing—6' x 11' or 7 ' x 11' or 8' x 11'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$5.15		
Every 15 feet	$5.15	264	$1,360
Every 18 feet	$5.15	220	$1,133
Every 21 feet	$5.15	188	$968
Every 24 feet	$5.15	165	$850
Four wires			$348
End post with anchor (installed)	$26.00	13	$338
End post without anchor (installed)	$18.00	13	$234

12 FOOT ROWS

	Spacing—6' x 12' or 7 ' x 12' or 8' x 12'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$5.15		
Every 15 feet	$5.15	242	$1,246
Every 18 feet	$5.15	201	$1,035
Every 21 feet	$5.15	172	$885
Every 24 feet	$5.15	151	$778
Four wires			$316
End post with anchor (installed)	$26.00	12	$312
End post without anchor (installed)	$18.00	12	$216

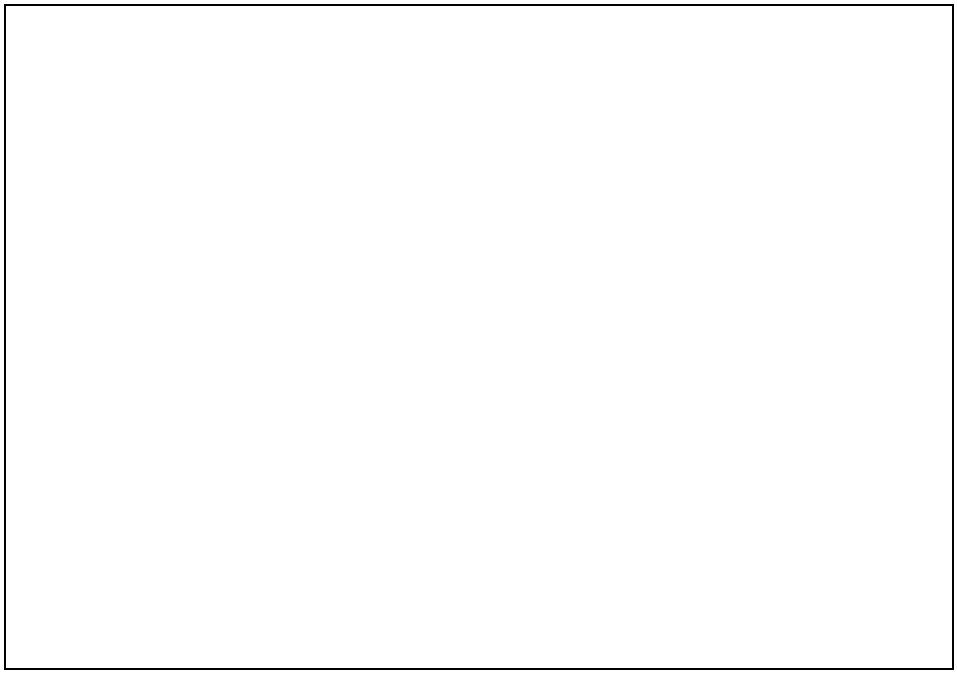
Based on 600 foot rows

VINEYARD STAKES AND TRELLISES

TABLE GRAPES

DOUBLE CROSSARM

Seven-foot stake, 42" top crossarm, 24" to 30" lower crossarm, with six wires (13-gauge)



VINEYARD STAKES AND TRELLISES

TABLE GRAPES

DOUBLE CROSSARM

10 FOOT ROWS

	Spacing—6' x 10' or 7 ' x 10' or 8' x 10'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$6.00		
Every 15 feet	$6.00	290	$1,740
Every 18 feet	$6.00	242	$1,452
Every 21 feet	$6.00	207	$1,242
Every 24 feet	$6.00	182	$1,092
Six wires			$576
End post with anchor (installed)	$26.00	14	$364
End post without anchor (installed)	$18.00	14	$252

11 FOOT ROWS

	Spacing—6' x 11' or 7 ' x 11' or 8' x 11'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$6.00		
Every 15 feet	$6.00	264	$1,584
Every 18 feet	$6.00	220	$1,320
Every 21 feet	$6.00	188	$1,128
Every 24 feet	$6.00	165	$990
Six wires			$522
End post with anchor (installed)	$26.00	13	$338
End post without anchor (installed)	$18.00	13	$234

12 FOOT ROWS

	Spacing—6' x 12' or 7 ' x 12' or 8' x 12'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$6.00		
Every 15 feet	$6.00	242	$1,452
Every 18 feet	$6.00	201	$1,206
Every 21 feet	$6.00	172	$1,032
Every 24 feet	$6.00	151	$906
Six wires			$480
End post with anchor (installed)	$26.00	12	$312
End post without anchor (installed)	$18.00	12	$216

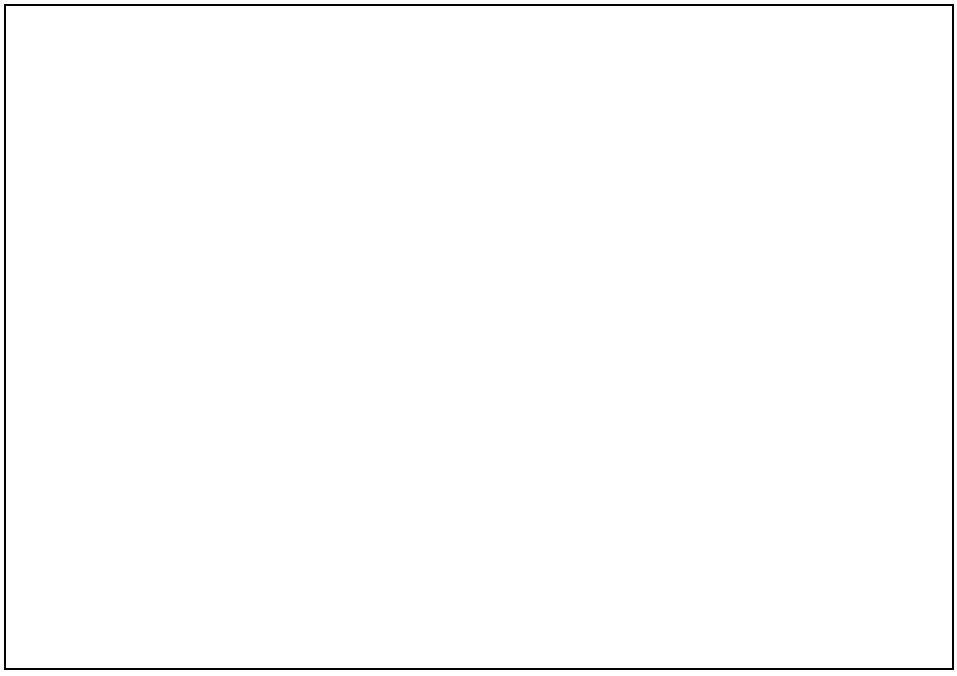
Based on 600 foot rows

VINEYARD STAKES AND TRELLISES

TABLE GRAPES/RAISINS

OPEN GABLE TRELLIS

Eight-foot steel post, 4' angle iron on each side of post forming V with the tops approximately 6' to 7' apart, with 3 to 4 wires (13-gauge) on each side



VINEYARD STAKES AND TRELLISES

TABLE GRAPES/RAISINS

OPEN GABLE TRELLIS

10 FOOT ROWS

	Spacing—6' x 10' or 7 ' x 10' or 8' x 10'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$11.00		
Every 18 feet	$11.00	242	$2,662
Every 21 feet	$11.00	207	$2,277
Every 24 feet	$11.00	182	$2,002
Six wires			$576
Eight wires			$768
End post with anchor (installed)	$30.00	14	$420

11 FOOT ROWS

	Spacing—6' x 11' or 7 ' x 11' or 8' x 11'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$11.00		
Every 18 feet	$11.00	220	$2,420
Every 21 feet	$11.00	188	$2,068
Every 24 feet	$11.00	165	$1,815
Six wires			$523
Eight wires			$696
End post with anchor (installed)	$30.00	13	$390

12 FOOT ROWS

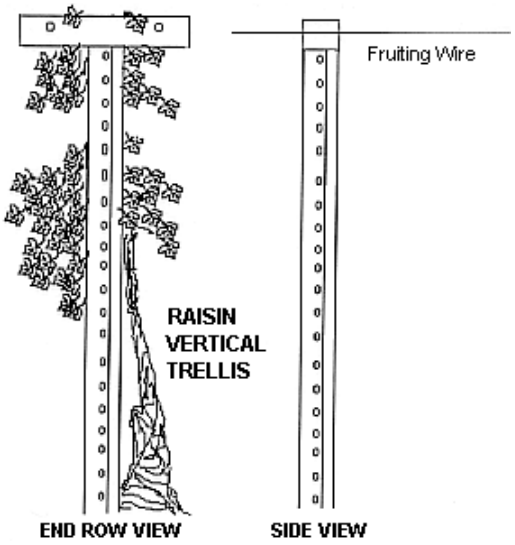
	Spacing—6' x 12' or 7 ' x 12' or 8' x 12'		
	Cost Per Unit	**Posts Per Acre**	**Cost Per Acre**
Post and crossarm assembly	$11.00		
Every 18 feet	$11.00	201	$2,211
Every 21 feet	$11.00	172	$1,892
Every 24 feet	$11.00	151	$1,661
Six wires			$480
Eight wires			$640
End post with anchor (installed)	$30.00	12	$360

Based on 600 foot rows

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

VERTICAL TRELLIS



Commonly used on raisins with 12' spacing.

Materials: 8' wooden end posts with 7' medium T stakes at each vine. A single 24" metal crossarm with two 13-gauge wires.

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

TRELLIS

10 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 10'	6' x 10'	7' x 10'
Light 7' stake and 24" crossarm	$3.35				
Every 5 feet	$3.35	871	$2,918		
Every 6 feet	$3.35	726		$2,432	
Every 7 feet	$3.35	622			$2,084
Two wires			$192	$192	$192
End post	$22.00	14	$308	$308	$308
Light 7' stake with no crossarm	$2.35		$2,046	$1,706	$1,462
One wire			$96	$96	$96

11 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 11'	6' x 11'	7' x 11'
Light 7' stake and 24" crossarm	$3.35				
Every 5 feet	$3.35	792	$2,653		
Every 6 feet	$3.35	660		$2,211	
Every 7 feet	$3.35	566			$1,896
Two wires			$173	$173	$173
End post	$22.00	13	$286	$286	$286
Light 7' stake with no crossarm	$2.35		$1,861	$1,551	$1,330
One wire			$87	$87	$87

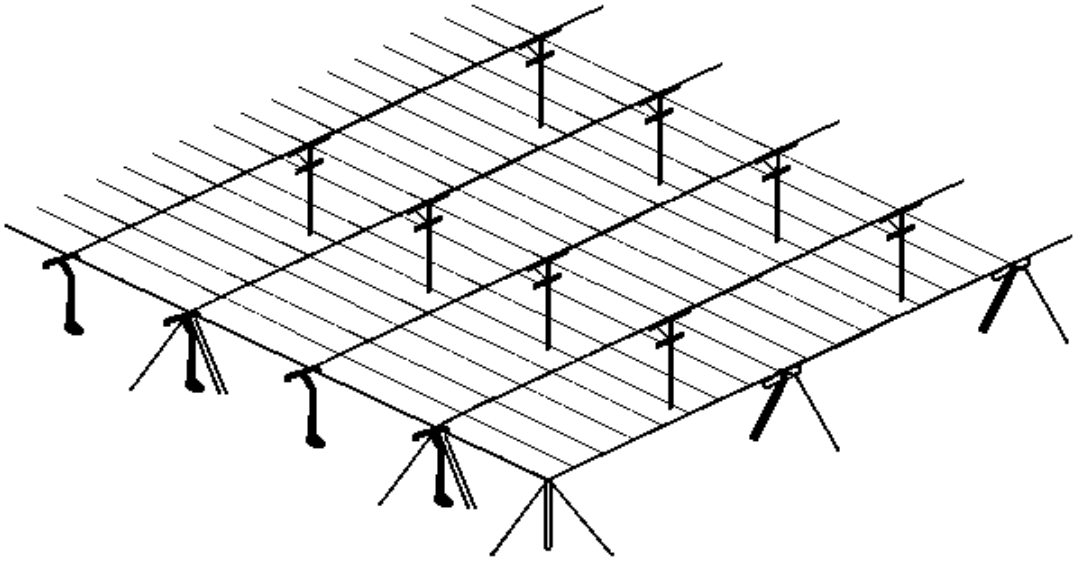
12 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 12'	6' x 12'	7' x 12'
Light 7' stake and 24" crossarm	$3.35				
Every 5 feet	$3.35	726	$2,432		
Every 6 feet	$3.35	605		$2,027	
Every 7 feet	$3.35	518			$1,735
Two wires			$146	$146	$146
End post	$22.00	12	$264	$264	$264
Light 7' stake with no crossarm	$2.35		$1,706	$1,422	$1,217
One wire			$73	$73	$73

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

OVERHEAD DRY ON VINE TRELLIS



Commonly used in 12' row with 6' between vines; occasionally used on 10' and 11' rows; a few 8' and 9' rows.

Materials: Wood post 12' on ends, 9' on sides, 10' wood post every third vine with 36" crossarm, 8 wires per row, and cable support.

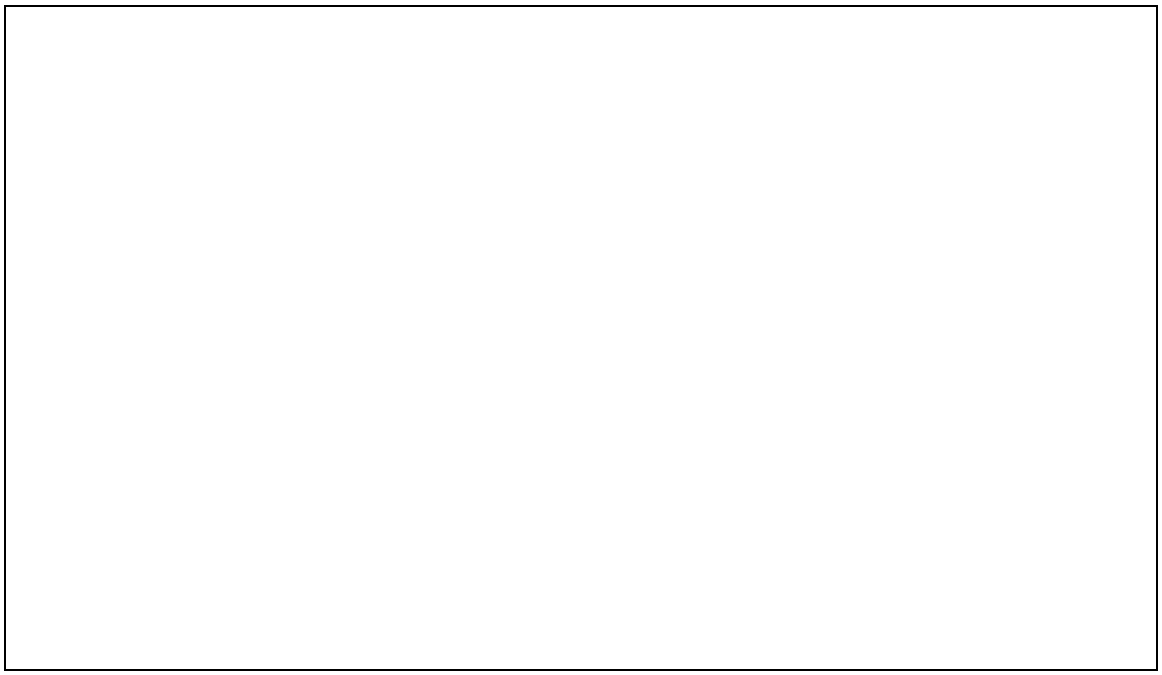
Trellising Cost Per Acre:

$4,300 to $4,600 on 6' x 12' spacing
$4,600 to $5,000 on 10' and 11' rows
$5,000 to $5,700 on 8' and 9' rows

VINEYARD STAKES AND TRELLISES

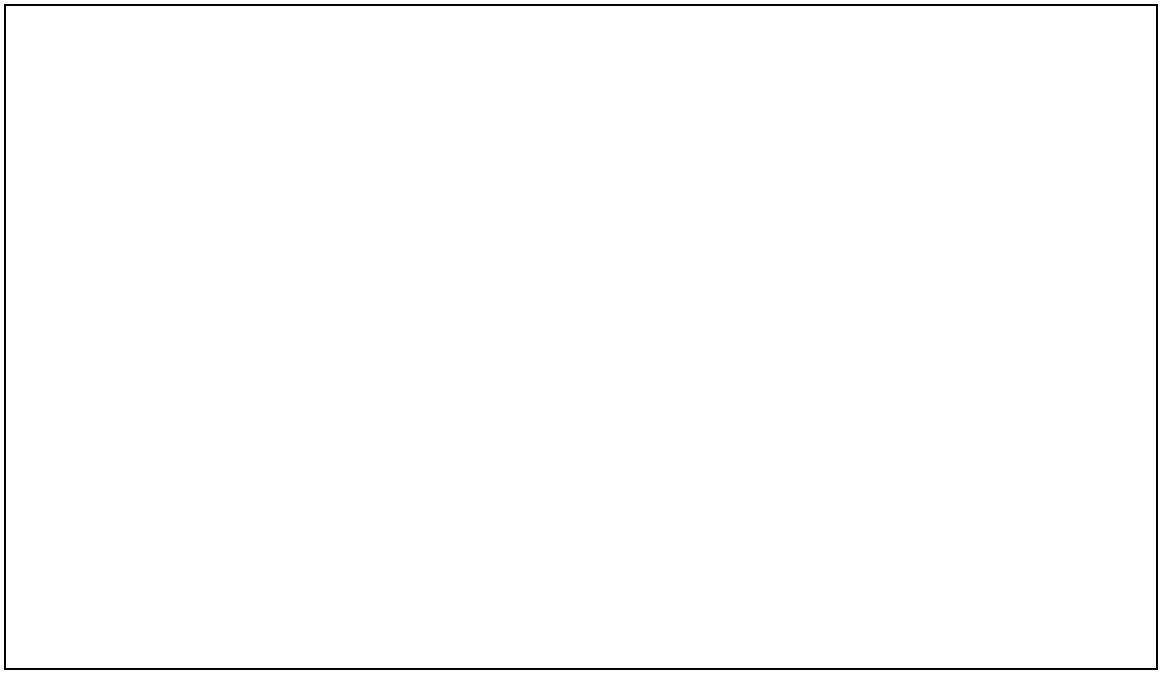
RAISIN GRAPES

SUN MAID SOUTHSIDE DRY ON VINE TRELLIS



8' T-post every 28' with two 10' crossarms and 5 wires. In between T-posts is 2 bent 7' to 8' T-posts with 2 wires. Each vine will have a training stake. Each end has a heavy steel post with anchors.

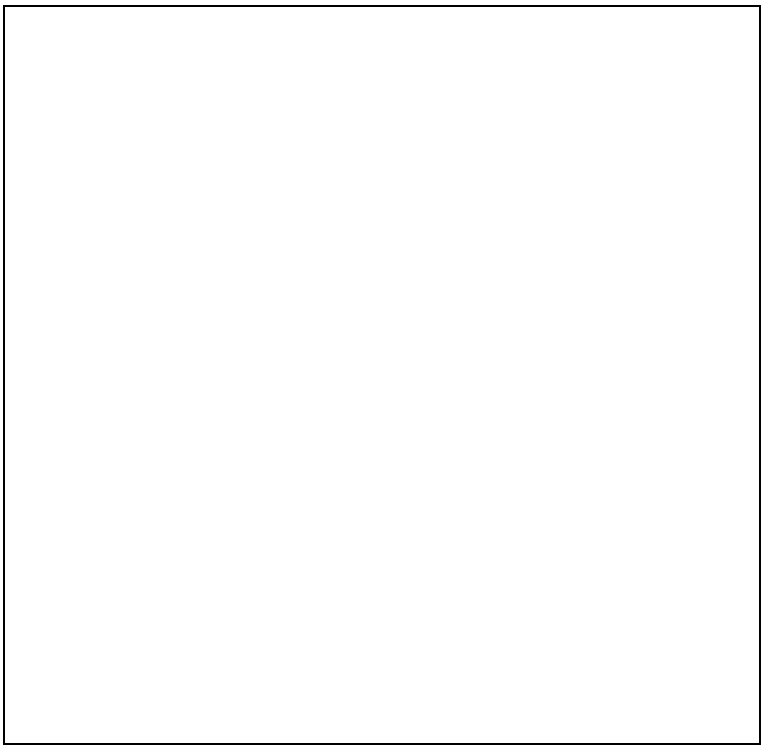
Cost: **$2,250 to $2,700** for 7' x 12' spacing.



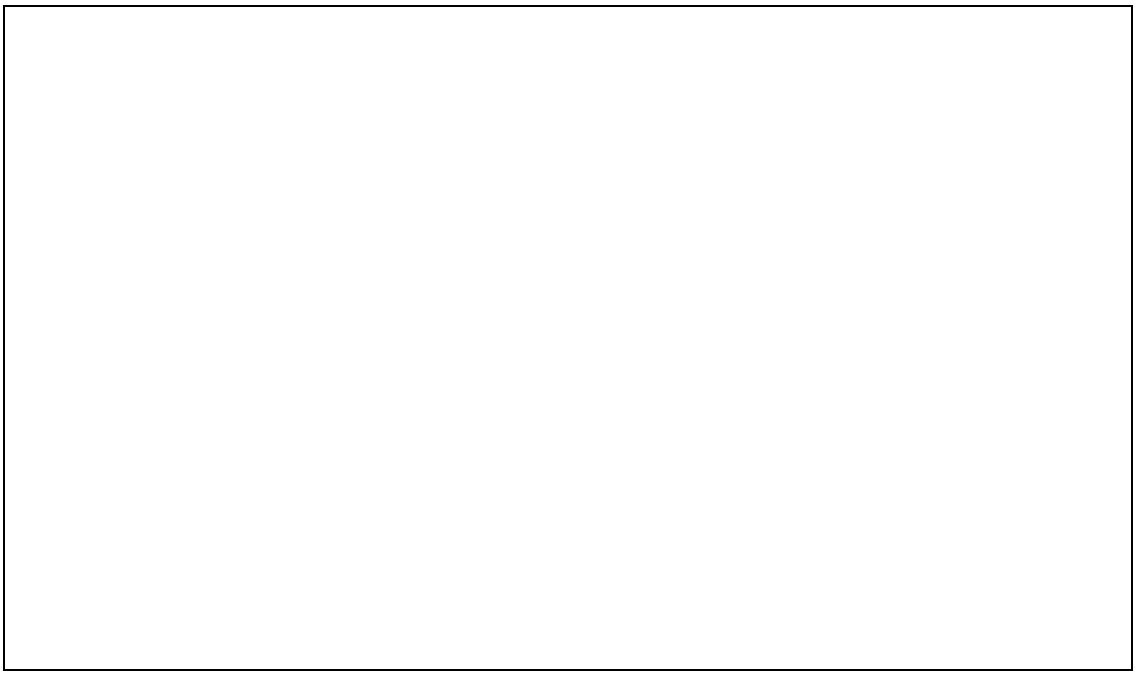
VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS



T-post with crossarm every vine

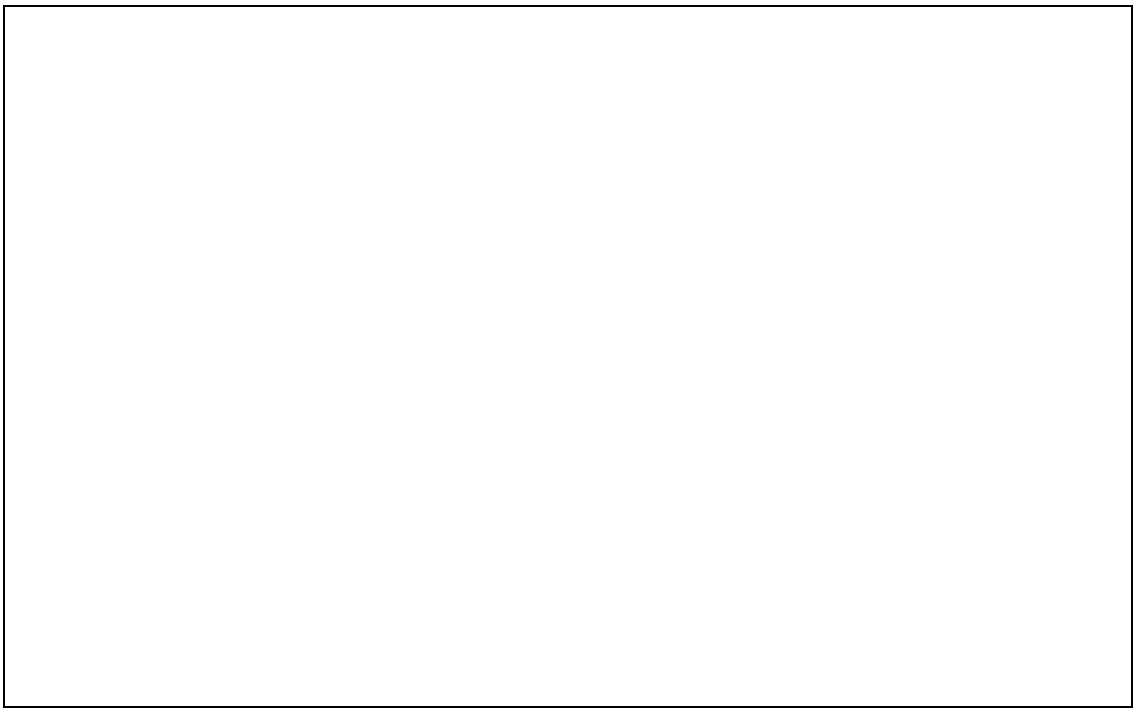


T-post and V crossarm

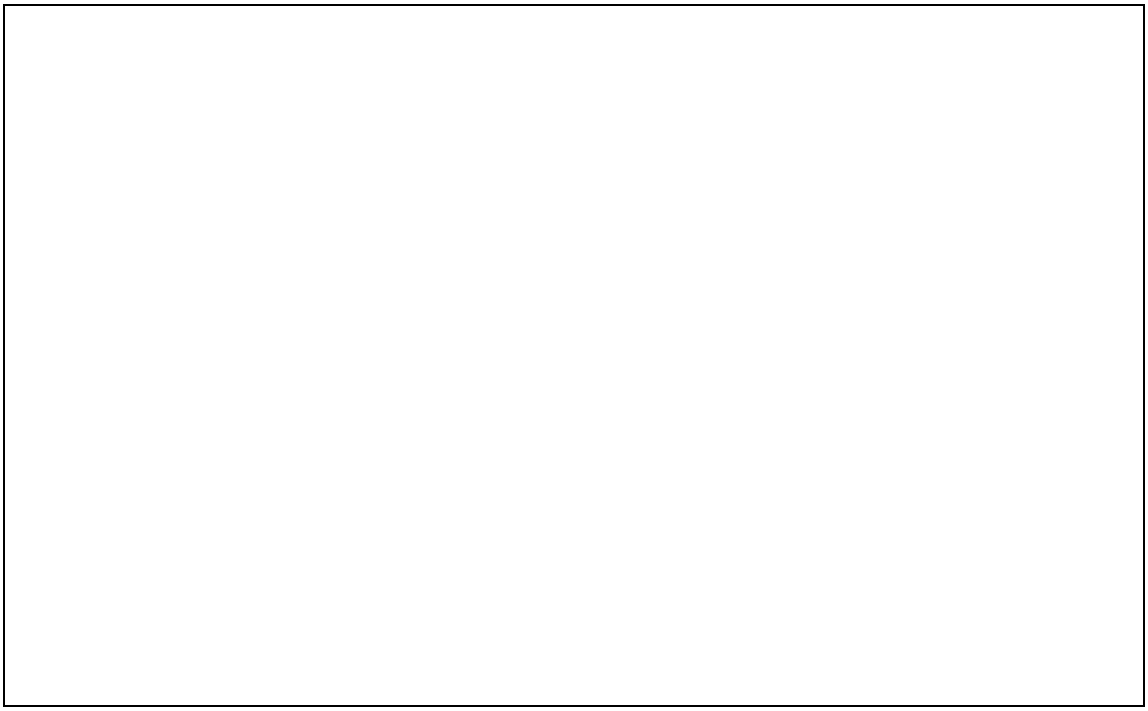
VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS



8' vertical line post with 4' T-posts in between



8' vertical line post with light grape stakes in between

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

6 FOOT ROWS

	Cost Per Unit	Vines Per Acre		
		1,815	1,452	1,210
		Cost Per Acre		
		4' x 6'	5' x 6'	6' x 6'
22 end posts per acre with anchor	$30	$660	$660	$660
22 end posts per acre without anchor	$22	$484	$484	$484
7' Light T-post (Add 30% for heavy T-post)				
Every vine	$2.35	$4,265	$3,412	$2,844
Every other vine	$1.18	$2,142	$1,713	$1,428
Every third vine	$.79	$1,434	$1,147	$956
Every fourth vine	$.59	$1,070	$857	$714
8' Vertical line post (13 ga.)				
Every vine	$4.75	$8,621	$6,897	$5,748
Every other vine	$2.38	$4,320	$3,456	$2,880
Every third vine	$1.59	$2,886	$2,309	$1,924
Every fourth vine	$1.19	$2,160	$1,728	$1,440
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55			
One rebar between posts	$.28	$508	$407	$339
Two rebars between posts	$.37	$672	$537	$448
Three rebars between posts	$.42	$762	$610	$508
24" crossarm (Add 25% for 30" crossarm)				
Every vine	$1.00	$1,815	$1,452	$1,210
Every other vine	$.50	$908	$726	$605
Every third vine	$.33	$599	$479	$399
Every fourth vine	$.25	$454	$363	$303
Two wires		$318	$318	$318
Three wires		$478	$478	$478
Four wires		$636	$636	$636
Five wires		$795	$795	$795
Six wires		$955	$955	$955
Seven wires		$1,114	$1,114	$1,114
Eight wires		$1,273	$1,273	$1,273

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

7 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		1,555	1,245	1,037	889
		Cost Per Acre			
		4' x 7'	5' x 7'	6' x 7'	7' x 7'
20 end posts per acre with anchor	$30	$600	$600	$600	$600
20 end posts per acre without anchor	$22	$440	$440	$440	$440
7' Light T-post (Add 30% for heavy T-post)					
Every vine	$2.35	$3,654	$2,925	$2,436	$2,089
Every other vine	$1.18	$1,835	$1,469	$1,224	$1,049
Every third vine	$.79	$1,228	$983	$819	$702
Every fourth vine	$.59	$917	$735	$612	$525
8' Vertical line post (13 ga.)					
Every vine	$4.75	$7,386	$5,913	$4,925	$4,223
Every other vine	$2.38	$3,700	$2,963	$2,468	$2,116
Every third vine	$1.59	$2,472	$1,980	$1,649	$1,414
Every fourth vine	$1.19	$1,850	$1,482	$1,234	$1,058
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55				
One rebar between posts	$.28	$435	$349	$290	$249
Two rebars between posts	$.37	$575	$460	$384	$329
Three rebars between posts	$.42	$653	$523	$435	$373
24" crossarm (Add 25% for 30" crossarm)					
Every vine	$1.00	$1,555	$1,245	$1,037	$889
Every other vine	$.50	$778	$622	$518	$445
Every third vine	$.33	$513	$411	$342	$293
Every fourth vine	$.25	$389	$311	$259	$222
Two wires		$270	$270	$270	$270
Three wires		$409	$409	$409	$409
Four wires		$546	$546	$546	$546
Five wires		$682	$682	$682	$682
Six wires		$818	$818	$818	$818
Seven wires		$954	$954	$954	$954
Eight wires		$1,080	$1,080	$1,080	$1,080

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

8 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		1,089	907	778	681
		Cost Per Acre			
		5' x 8'	6' x 8'	7' x 8'	8' x 8'
18 end posts per acre with anchor	$30	$540	$540	$540	$540
18 end posts per acre without anchor	$22	$396	$396	$396	$396
7' Light T-post (Add 30% for heavy T-post)					
Every vine	$2.35	$2,560	$2,131	$1,828	$1,600
Every other vine	$1.18	$1,285	$1,070	$918	$803
Every third vine	$.79	$860	$717	$615	$538
Every fourth vine	$.59	$642	$535	$459	$402
8' Vertical line post (13 ga.)					
Every vine	$4.75	$5,173	$4,308	$3,696	$3,235
Every other vine	$2.38	$2,592	$2,159	$1,852	$1,621
Every third vine	$1.59	$1,732	$1,442	$1,237	$1,083
Every fourth vine	$1.19	$1,296	$1,079	$926	$810
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55				
One rebar between posts	$.28	$305	$254	$218	$191
Two rebars between posts	$.37	$403	$336	$288	$252
Three rebars between posts	$.42	$458	$381	$327	$286
24" crossarm (Add 25% for 30" crossarm)					
Every vine	$1.00	$1,089	$907	$778	$681
Every other vine	$.50	$545	$454	$389	$341
Every third vine	$.33	$359	$299	$257	$225
Every fourth vine	$.25	$272	$227	$195	$170
Two wires		$240	$240	$240	$240
Three wires		$360	$360	$360	$360
Four wires		$478	$478	$478	$478
Five wires		$597	$597	$597	$597
Six wires		$719	$719	$719	$719
Seven wires		$838	$838	$838	$838
Eight wires		$956	$956	$956	$956

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

9 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		968	807	691	605
		Cost Per Acre			
		5' x 9'	6' x 9'	7' x 9'	8' x 9'
16 end posts per acre with anchor	$30	$480	$480	$480	$480
16 end posts per acre without anchor	$22	$352	$352	$352	$352
7' Light T-post (Add 30% for heavy T-post)					
Every vine	$2.35	$2,275	$1,896	$1,624	$1,422
Every other vine	$1.18	$1,142	$952	$815	$714
Every third vine	$.79	$765	$638	$546	$478
Every fourth vine	$.59	$571	$476	$408	$360
8' Vertical line post (13 ga.)					
Every vine	$4.75	$4,598	$3,833	$3,282	$2,874
Every other vine	$2.38	$2,304	$1,921	$1,645	$1,440
Every third vine	$1.59	$1,539	$1,283	$1,099	$962
Every fourth vine	$1.19	$1,152	$960	$822	$720
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55				
One rebar between posts	$.28	$271	$226	$193	$169
Two rebars between posts	$.37	$358	$299	$256	$224
Three rebars between posts	$.42	$407	$339	$290	$254
24" crossarm (Add 25% for 30" crossarm)					
Every vine	$1.00	$968	$807	$691	$605
Every other vine	$.50	$484	$404	$345	$302
Every third vine	$.33	$319	$266	$228	$200
Every fourth vine	$.25	$242	$202	$173	$151
Two wires		$214	$214	$214	$214
Three wires		$320	$320	$320	$320
Four wires		$427	$427	$427	$427
Five wires		$534	$534	$534	$534
Six wires		$640	$640	$640	$640
Seven wires		$748	$748	$748	$748
Eight wires		$854	$854	$854	$854

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

10 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		871	726	622	544
		Cost Per Acre			
		5' x 10'	6' x 10'	7' x 10'	8' x 10'
14 end posts per acre with anchor	$30	$420	$420	$420	$420
14 end posts per acre without anchor	$22	$308	$308	$308	$308
7' Light T-post (Add 30% for heavy T-post)					
Every vine	$2.35	$2,047	$1,705	$1,481	$1,298
Every other vine	$1.18	$1,028	$857	$734	$642
Every third vine	$.79	$688	$574	$491	$429
Every fourth vine	$.59	$514	$428	$367	$321
8' Vertical line post (13 ga.)					
Every vine	$4.75	$4,137	$3,448	$2,955	$2,584
Every other vine	$2.38	$2,073	$1,728	$1,480	$1,295
Every third vine	$1.59	$1,385	$1,154	$989	$865
Every fourth vine	$1.19	$1,036	$864	$740	$647
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55				
One rebar between posts	$.28	$244	$203	$174	$152
Two rebars between posts	$.37	$322	$269	$230	$201
Three rebars between posts	$.42	$366	$305	$261	$228
24" crossarm (Add 25% for 30" crossarm)					
Every vine	$1.00	$871	$726	$622	$544
Every other vine	$.50	$436	$363	$311	$272
Every third vine	$.33	$287	$240	$205	$180
Every fourth vine	$.25	$218	$182	$155	$136
Two wires		$192	$192	$192	$192
Three wires		$288	$288	$288	$288
Four wires		$384	$384	$384	$384
Five wires		$460	$460	$460	$460
Six wires		$576	$576	$576	$576
Seven wires		$672	$672	$672	$672
Eight wires		$768	$768	$768	$768

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

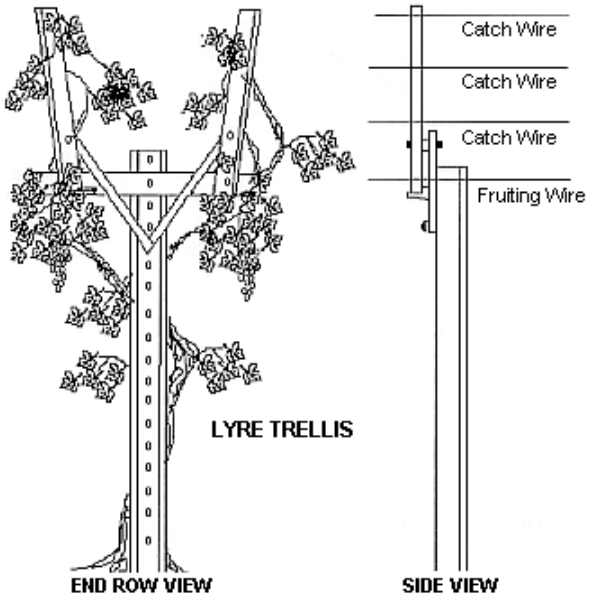
11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	$30	$390	$390	$390	$390
13 end posts per acre without anchor	$22	$286	$286	$286	$286
7' Light T-post (Add 30% for heavy T-post)					
Every vine	$2.35	$1,861	$1,551	$1,330	$1,163
Every other vine	$1.18	$935	$779	$668	$584
Every third vine	$.79	$626	$521	$447	$391
Every fourth vine	$.59	$467	$389	$334	$292
8' Vertical line post (13 ga.)					
Every vine	$4.75	$3,762	$3,135	$2,688	$2,351
Every other vine	$2.38	$1,885	$1,571	$1,347	$1,178
Every third vine	$1.59	$1,259	$1,049	$900	$787
Every fourth vine	$1.19	$942	$785	$674	$589
4' Rebar or pencil rod at each vine (between T-post or vertical line)	$.55				
One rebar between posts	$.28	$222	$185	$158	$139
Two rebars between posts	$.37	$293	$244	$209	$183
Three rebars between posts	$.42	$333	$277	$238	$208
24" crossarm (Add 25% for 30" crossarm)					
Every vine	$1.00	$792	$660	$566	$495
Every other vine	$.50	$396	$330	$283	$247
Every third vine	$.33	$261	$218	$186	$163
Every fourth vine	$.25	$198	$165	$142	$124
Two wires		$174	$174	$174	$174
Three wires		$262	$262	$262	$262
Four wires		$348	$348	$348	$348
Five wires		$434	$434	$434	$434
Six wires		$523	$523	$523	$523
Seven wires		$610	$610	$610	$610
Eight wires		$696	$696	$696	$696

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE TRELLIS



Commonly used in wide row of 11' to 12'.

Materials: Heavy steel or wood end posts; heavy and medium T stakes with anchor plates; 8' to 12' gauge wires on metal open Lyre crossarms with a typical width of 42" at the top; 6 to 10 wires.

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE SYSTEM

11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	$30	$390	$390	$390	$390
13 end posts per acre without anchor	$22	$286	$286	$286	$286
Heavy steel stake with open lyre crossarm					
Every vine	$10.80				
Every other vine	$5.40	$4,276	$3,564	$3,056	$2,673
Every third vine	$3.60	$2,851	$2,376	$2,037	$1,782
Every fourth vine	$2.70	$2,138	$1,782	$1,528	$1,336
4' Rebar or pencil rod at each vine (between lyre crossarm)	$.55				
One rebar between lyres	$.28	$222	$185	$158	$139
Two rebars between lyres	$.37	$293	$244	$209	$183
Three rebars between lyres	$.42	$333	$277	$238	$208
Six wires		$523	$523	$523	$523
Seven wires		$610	$610	$610	$610
Eight wires		$696	$696	$696	$696
Nine wires		$782	$782	$782	$782
Ten wires		$869	$869	$869	$869

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE SYSTEM

12 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		726	605	518	454
		Cost Per Acre			
		5' x 12'	6' x 12'	7' x 12'	8' x 12'
12 end posts per acre with anchor	$30	$360	$360	$360	$360
12 end posts per acre without anchor	$22	$264	$264	$264	$264
Heavy steel stake with open lyre crossarm					
Every vine	$10.80				
Every other vine	$5.40	$3,920	$3,267	$2,797	$2,451
Every third vine	$3.60	$2,614	$2,178	$1,864	$1,634
Every fourth vine	$2.70	$1,960	$1,633	$1,398	$1,225
4' Rebar or pencil rod at each vine (between lyre crossarm)	$.55				
One rebar between lyres	$.28	$203	$169	$145	$127
Two rebars between lyres	$.37	$269	$224	$192	$168
Three rebars between lyres	$.42	$305	$254	$218	$191
Six wires		$479	$479	$479	$479
Seven wires		$560	$560	$560	$560
Eight wires		$640	$640	$640	$640
Nine wires		$720	$720	$720	$720
Ten wires		$800	$800	$800	$800

VINEYARD STAKES AND TRELLISES

MISCELLANEOUS

COMPONENT COSTS TO CALCULATE COSTS PER ACRE

WIRE PRICE PER ACRE

Based on 10' spacing between rows of vines and 13 gauge wire	
1 wire	$96
2 wire	$192
3 wire	$288
4 wire	$384
5 wire	$480

METAL STAKES AND CROSSARMS

T-Post Stakes and Training Stakes			Metal Crossarms With U Bolts (Medium Grade)	
7'	.95 lbs/ft	$2.35	6"	$.48
7'	1.25 lbs/ft	$3.00	12"	$.68
6'	.95 lbs/ft	$1.90	18"	$.84
6'	1.25 lbs/ft	$2.38	24"	$1.00
5'	.95 lbs/ft	$1.70	30" to 34"	$1.30
4'	Rebar Training Stake	$.55	36"	$1.95
4'	¼" Steel Training Stake	$.45	42"	$2.30

Heavy duty elaborate galvanized crossarms can run 40 to 50 percent more.

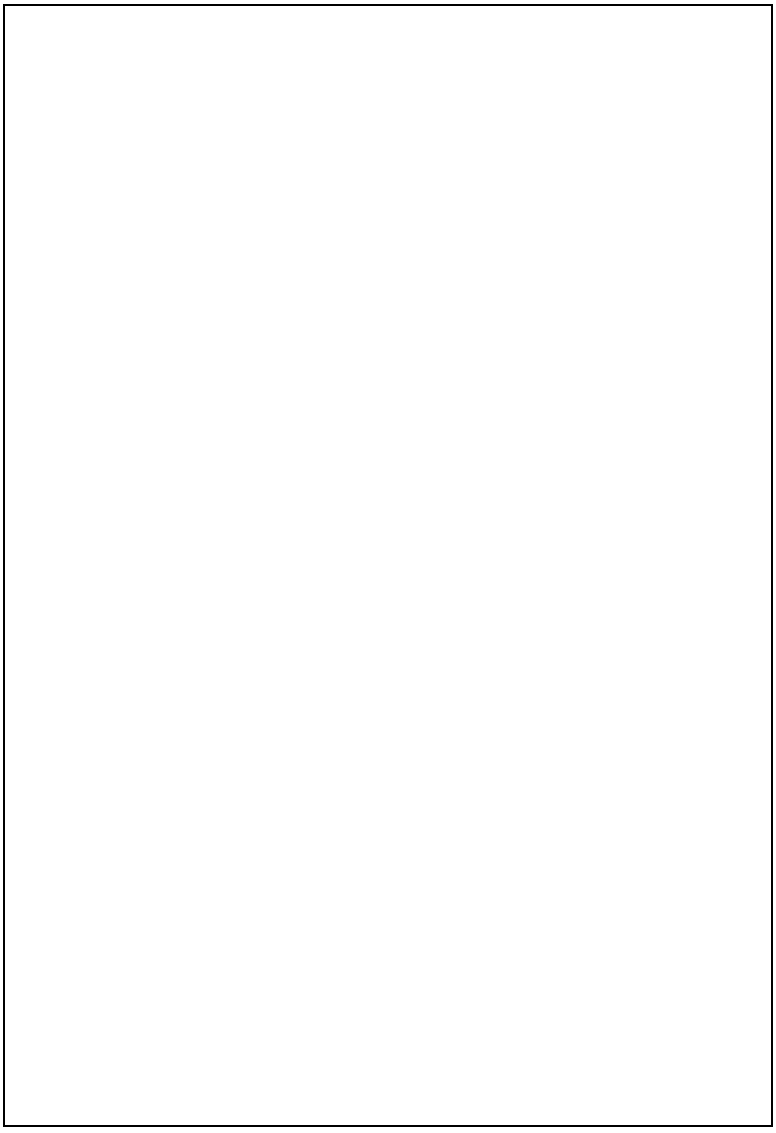
WOOD STAKES AND CROSSARMS

Stakes			Crossarms With Clips		Crossarms With U-Bolts	
5'	1 ¾" sq	$1.21	12"	$.45	12"	$.45 - $.55
6'	1 ¾" sq	$1.48	24"	$.60	24"	$.75 - $.90
7'	1 ¾" sq	$1.79	30"	$.70	30"	$.85 - $.95
8'	3" to 4"	$2.75 – $3.50	36"	$.85	36"	$.95 - $1.05

Price varies with quality

VINEYARD STAKES AND TRELLISES

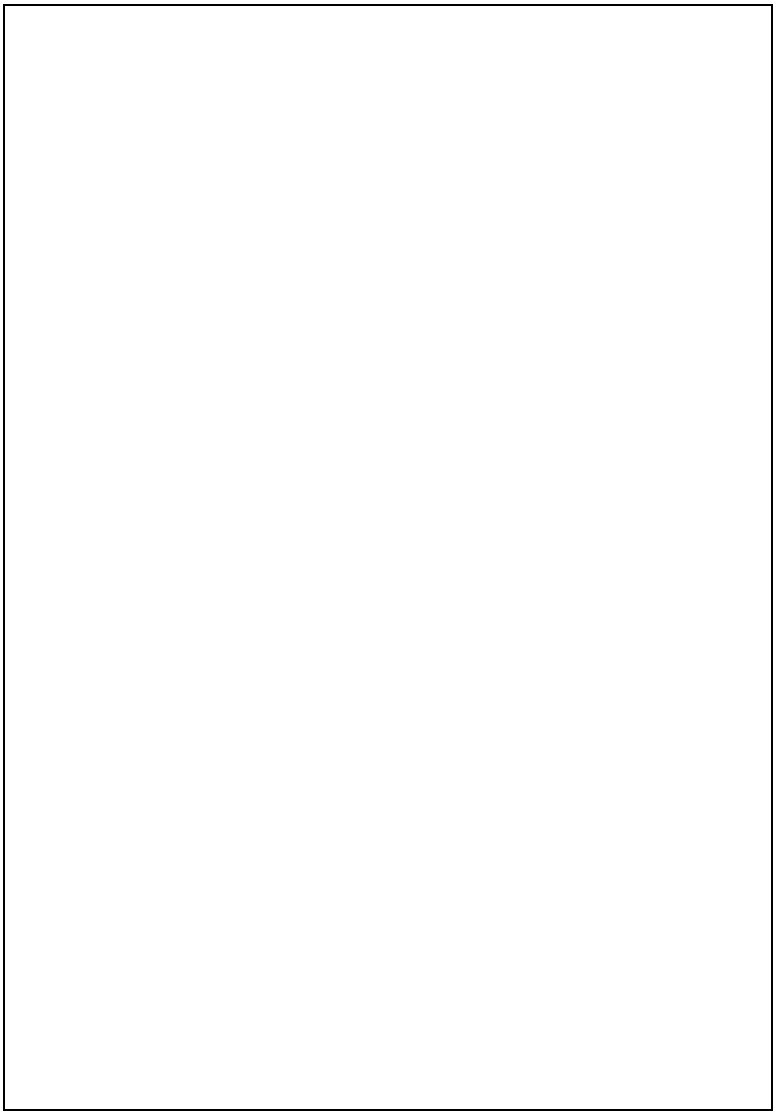
MISCELLANEOUS



4' Pencil rod and rebar
$.45 to $.55 each

VINEYARD STAKES AND TRELLISES

MISCELLANEOUS



T-post with J.R. wire clips

7' heavy T-post: **$3.00** installed
7' light T-post: **$2.35** installed

J.R. clips: **$.17** each

Vertical line post with wire slots

8' Vertical line post: **$4.75** installed

VINEYARD STAKES AND TRELLISES

MISCELLANEOUS

Steel end post with spade

$18.00 to **$20.00** each
$3.60 install

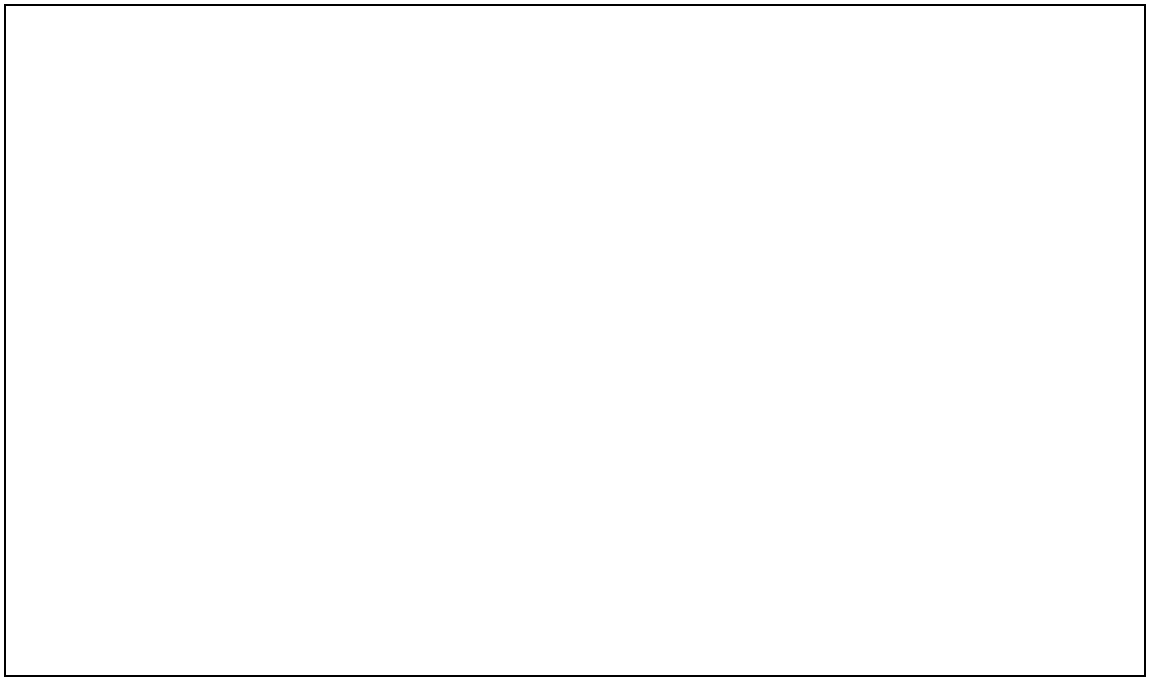
Screw-in earth anchor

4" x 30" : **$4.20**
6" x 36" : **$5.40**
$3.00 install

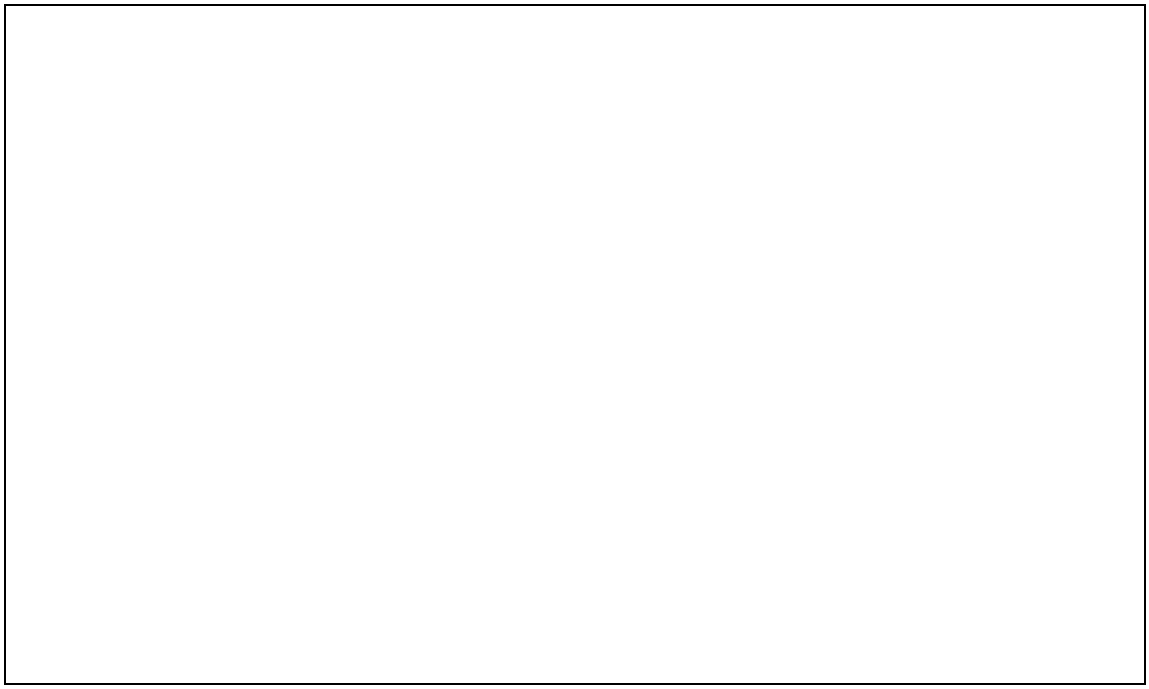
VINEYARD STAKES AND TRELLISES

MISCELLANEOUS

DEER FENCE



7' Deer fence made with 9' T-post and 9' wood stakes
6 ½' woven wire with 2 barbed wires on top and steel gates at drives
Cost: **$4.00** to **$5.25** per linear foot



VINEYARD STAKES AND TRELLISES

USEFUL INFORMATION

WIRE

10 Gauge	2,060 ft. Per 100 lbs. roll
11 Gauge	2,580 ft. Per 100 lbs. roll
12 Gauge	3,370 ft. Per 100 lbs. roll
13 Gauge	4,470 ft. Per 100 lbs. roll
14 Gauge	5,860 ft. Per 100 lbs. roll

PLANTING SPACING AND WIRE CHART

Planting Pattern Between Plants—Between Rows	One-Wire System No. of Wire Feet Required Per Acre	No. of Plants Required Per Acre
3' x 6'	7,260'	2,420
4' x 6'	7,260'	1,815
5' x 6'	7,260'	1,452
6' x 6'	7,260'	1,210
3' x 7'	6,222'	2,074
4' x 7'	6,222'	1,555
5' x 7'	6,222'	1,245
6' x 7'	6,222'	1,037
7' x 7'	6,222'	889
3' x 8'	5,445'	1,815
4' x 8'	5,445'	1,361
5' x 8'	5,445'	1,089
6' x 8'	5,445'	907
7' x 8'	5,445'	778
8' x 8'	5,445'	681
3' x 9'	4,850'	1,613
4' x 9'	4,850'	1,210
5' x 9'	4,850'	968
6' x 9'	4,850'	807
7' x 9'	4,850'	691
8' x 9'	4,850'	605
5' x 10'	4,355'	871
6' x 10'	4,356'	726
7' x 10'	4,354'	622
8' x 10'	4,352'	544
5' x 11'	3,960'	792
6' x 11'	3,960'	660
7' x 11'	3,962'	566
8' x 11'	3,960'	495
5' x 12'	3,630'	726
5½' x 12'	3,630'	660
6' x 12'	3,630'	605
7' x 12'	3,626'	518
8' x 12'	3,632'	454

AH 534.78: STEEL BUILDINGS

The *all steel* building serves a variety of functions for the farmer/rancher with its most common use being either storage space for farm machinery or storage of feeds and grains. The typical building as described in this section reflects the cost of a basic building.

In addition, there are instances where the building cost is modified for wall height, partitions, and extra electrical circuits within the structure.

BASIC BUILDING COST

Square-foot costs of basic buildings include the following components:

1. Foundation as required for normal soil conditions.

2. Concrete slab floor, 4 inches to 6 inches thick with wire mesh.

3. A steel building made up of these components:

    - Steel frame or bents, 20, 25, or 30 feet on center.
    - Steel roof purlin, 4 1/2 to 5 1/2 feet on center.
    - Steel wall grits 6 to 7 feet on center.
    - Twenty-six gauge galvanized steel on walls and roof.
    - Window area equal to 2 percent of floor area.
    - Minimal light fixtures—including wiring.
    - One rotary vent per bay.
    - Two walk-in doors.
    - Two overhead or sliding doors.
    - Fourteen-foot eave height.

Basic steel buildings are of two types: the low profile roof pitch (1" in 12") and the more conventional barn-like roof pitch (4" in 12"). The cost differential between the two is considered immaterial for appraisal purposes.

ADDITIVE COSTS

Additive costs are the in-place cost components not included in the basic square-foot cost but are those costs found as part of steel buildings. They are added to the basic building cost to arrive at a total building cost.

STEEL BUILDINGS

COST PER SQUARE FOOT

	Width											
Length	**20'**	**25'**	**30'**	**35'**	**40'**	**45'**	**50'**	**55'**	**60'**	**65'**	**70'**	**80'**
20'	25.28											
25'	24.98	24.49										
30'	24.49	23.70	22.79									
35'	23.70	22.79	21.55	20.86								
40'	22.99	21.55	21.36	20.28	19.70							
50'	21.36	20.58	20.06	19.64	18.78	17.93	17.57					
60'	20.58	20.50	19.64	18.78	17.99	17.57	17.28	16.72				
75'	20.06	19.64	18.85	17.99	17.71	17.28	16.72	16.21				
80'	19.64	18.85	17.99	17.57	17.28	16.72	16.21	15.85	15.43	15.00	14.65	14.41
90'	18.85	17.99	17.57	17.28	16.72	16.21	15.85	15.43	15.00	14.65	14.41	13.76
100'	17.99	17.64	17.28	16.72	16.21	15.85	15.43	15.00	14.65	14.41	13.76	13.57
135'		17.28	16.72	16.21	15.85	15.43	15.00	14.65	14.41	13.76	13.57	13.30
150'				15.85	15.43	15.00	14.65	14.41	13.76	13.57	13.30	12.98
175'				15.43	15.00	14.65	14.41	13.76	13.57	13.30	12.98	12.85
200'					14.65	14.41	13.76	13.57	13.30	12.98	12.85	12.65
225'						13.76	13.57	13.30	12.98	12.85	12.65	12.58
250'							13.30	12.98	12.85	12.65	12.58	12.58

ALTERNATE COSTS

Dirt Floor: Due to increased size of footings/foundation, no adjustment for dirt floor.

Wall Height: Add or subtract 3 percent per square foot from basic cost for each foot of variation above or below the basic 14-foot eave height.

Missing Wall Cover: Deduct **$1.80** for each square foot of missing wall area.

Electrical Power: Deduct **$1.50 - $2.00** per square foot for lack of power.

The above costs are for 26 gauge steel cover.

STEEL BUILDINGS

ADDITIVE COSTS

The cost of additives, such as doors and windows, that replace a portion of the exterior skin of the building, reflects the net added cost of the component in-place. The cost of the skin that is replaced has been deducted from the total cost of the additive components. No further deduction is necessary.

OVERHEAD DOORS WITH CHAIN HOIST OPENERS

	Height				
Width	**8'**	**10'**	**12'**	**14'**	**16'**
8'	$750	$800	$875	$975	
10'	775	840	900	1,050	$1,200
12'	850	925	1,000	1,150	1,300
14'	1,025	1,100	1,200	1,300	1,600
16'	1,150	1,250	1,375	1,600	1,800
18'	1,400	1,500	1,600	1,800	

WALK-IN DOORS

Flush 3' x 7'	$600
Half Glass	$650

ROTARY VENTS

20"	$250

RIDGE VENTS

9" x 10'	$425
12" x 10'	$450

GUTTERS AND DOWNSPOUTS

Per lineal foot	$6.50

SKYLIGHTS

3' x 10'	$60 - $90

WINDOWS

3' x 3'	$145
3' x 6'	170
4' x 6'	230
4' x 8'	280

STEEL BUILDINGS

ADDITIVE COSTS

HEATING

Overhead Suspended Unit	Cost Per Unit
75,000 BTU	$1,100
100,000 BTU	1,300
200,000 BTU	1,800
300,000 BTU	2,150

RESTROOMS

	Total Cost
Cost includes 2 fixtures, electrical service, and all partitions. Add for septic tank.	$4,500 - $5,500

OFFICE AREAS

	Square Foot
Cost includes partitioning, interior finish, trim, and doors	$35 - $50

PARTITIONS

	Per Surface Foot
Gypsum on wood frame	$3.50
Plaster on wood frame	$5.00
Paneling (average quality)	$4.00 - $5.00

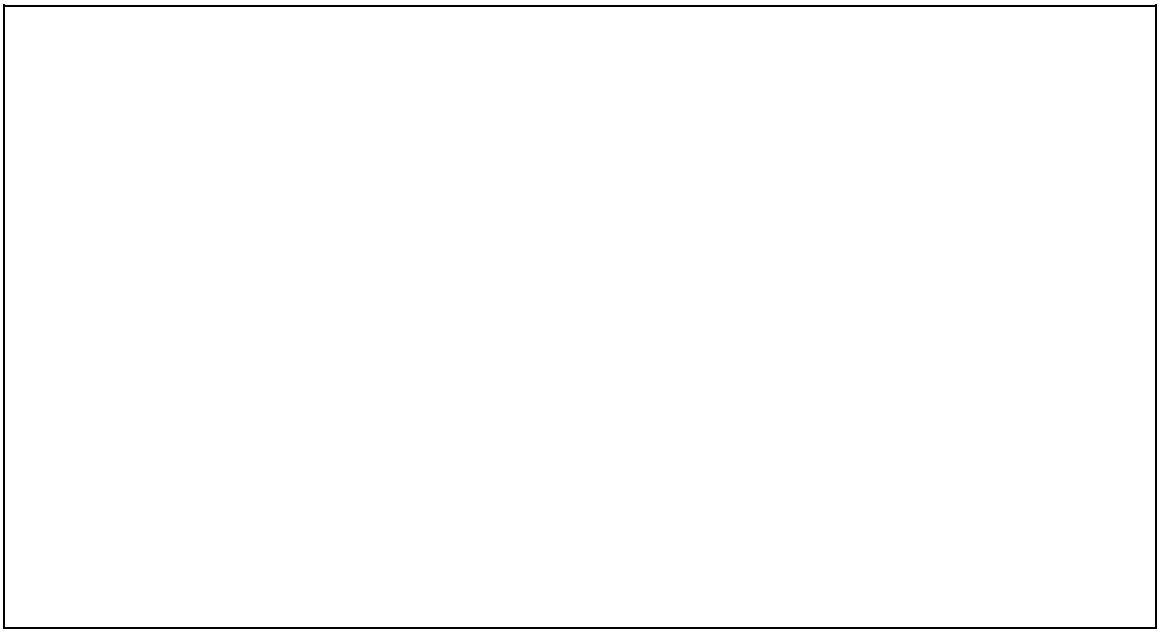
INSULATION

	Square Foot
R-13	$.60 - $.70
R-6	$.45 - $.50

STEEL BUILDINGS

PICTURES

AH 534.79: MISCELLANEOUS COSTS



PIT TYPE MOTOR TRUCK SCALES WITH CONCRETE DECK

Scales			Scale Pit		
Tons Capacity	**Platform Size**	**Total Cost**	**Size**	**Standard Cost**	**Add for: 12' Width**
20	25' x 10'	$ 9,800	25' x 10'	$ 9,800	900
30	25' x 10'	10,800	40' x 10'	13,100	1,000
50	40' x 10'	16,600	50' x 10'	14,500	1,100
50	50' x 10'	17,500	60' x 10'	15,400	1,300
60	60' x 10'	19,200	70' x 10'	16,000	1,500
60	70' x 10'	22,400	80' x 10'	17,100	2,100
60	80' x 10'	25,300	90' x 10'	18,750	
80	80' x 10'	30,700	90' x 10'	18,750	
100	90' x 10'	34,200	100' x 10'	20,500	

Pitless above-ground scales, deduct 25% from above prices

ADD FOR WEIGHT RECORDING EQUIPMENT

Electronic indicator	$1,000
Ticket printer	$1,000

EXAMPLE OF MOTOR TRUCK SCALE COST

Scales:	80 ton capacity, 80' x 10' platform	$30,700
Scale Pit:	90' x 10' size, standard	18,750
	Electric weight recording equipment and printer	2,000
	Total	$51,450

MISCELLANEOUS COSTS

ELEVATED HOPPER TANK – Steel Support Legs, Stiffened Side Walls, Ladder, Roof Access Door, includes Concrete Base

Size	Cost
80 Tons	$ 10,100
100 Tons	12,800
130 Tons	15,000
160 Tons	17,200
200 Tons	20,600
235 Tons	22,800
300 Tons	29,200
350 Tons	36,100
400 Tons	40,300

CONCRETE HORIZONTAL OR FLAT STORAGE

Cwt	Cost per Cwt
28,000	$3.50
42,000	3.36
56,000	3.20
85,000	3.05
110,000	2.92
140,000	2.84
200,000	2.75
400,000	2.40
600,000	2.30

MISCELLANEOUS COSTS

ABOVE-GROUND FUEL TANKS & CONTAINMENT SYSTEMS

PREFABRICATED CONCRETE FUEL CONTAINMENT TUBS

400 gallon capacity containment	$825
500 gallon capacity containment	$1,050
1,000 gallon capacity containment	$1,500

CONTAINMENT WITH TANK AND ELECTRIC PUMPS

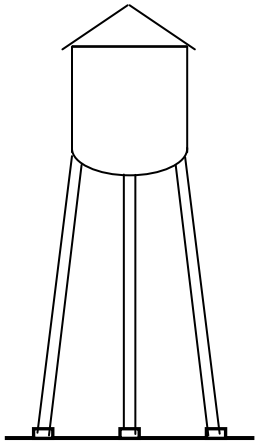
500 gallon – diesel	$3,800
1,000 gallon – diesel	$5,200
500 gallon – gasoline	$4,600
1,000 gallon – gasoline	$6,000

ABOVE-GROUND FUEL TANKS (Steel Tanks with Thick Outer Shell of Concrete)

Gallons	Cost
500, with electric pump	$5,500 - $6,500
1,000, with electric pump	$8,800
2,000, with electric pump	$12,000 - $13,000
Double unit—(1) 1,000 gallon, (1) 500 gallon with 2 electric pumps	$9,500 - $10,500

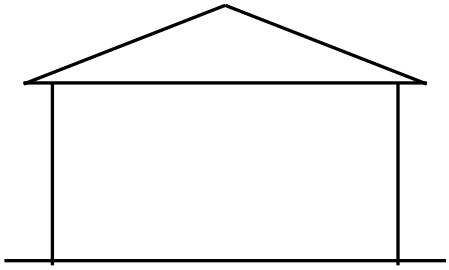
MISCELLANEOUS COSTS

ELEVATED STEEL WATER STORAGE TANKS



Gallon Capacity	Total Cost of 75' Tower and Tank	Total Cost of 100' Tower and Tank
25,000	$200,000	$230,000
30,000	213,000	245,000
40,000	225,000	252,000
50,000	231,000	264,000
60,000	242,000	276,000
75,000	248,000	290,000
100,000	287,000	315,000
150,000	364,000	389,000
200,000	450,000	477,000
300,000	560,000	604,000
500,000	753,000	805,000
1,000,000	1,250,000	1,380,000

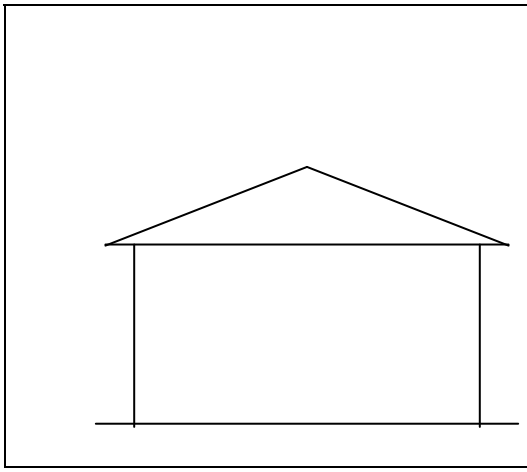
WELDED STEEL WATER STORAGE TANKS ON GROUND WITH FOUNDATION



Gallon Capacity	Total Cost of Tank on Ground
25,000	$39,000
30,000	44,000
40,000	49,500
50,000	59,500
60,000	65,000
75,000	77,000
100,000	95,500
150,000	110,000
200,000	125,000
300,000	158,000
500,000	223,000
1,000,000	345,000

MISCELLANEOUS COSTS

BOLTED STEEL WATER TANKS



Gallon Capacity	Total Cost of Tank on Ground
10,000	$12,700
20,000	18,300
30,000	23,000
50,000	30,300
75,000	36,000
100,000	38,500
125,000	46,600
150,000	56,000
200,000	67,000

Price varies due to gauge, height, diameter, and delivery costs.
Price typically includes crushed rock base or concrete on longer tanks.

POLYETHYLENE OR FIBERGLASS TANKS (Used for Ag Chemicals or Liquid Fertilizers)

Capacity (Gallons)	Cost
1,000	$ 980
2,000	1,800
3,000	2,750
4,000	3,500
5,000	4,400
6,000	5,100
8,000	6,600
10,000	7,900

Add **$3.00** per square foot for concrete base

Polyethylene water only tanks, deduct 20% from above prices.

MISCELLANEOUS COSTS

STEEL GRAIN BINS

Sacramento and Northern California

Steel grain bins are used for storage and drying of small grains. The typical storage bin has metal walls and roof, a concrete floor and foundation. The drying bin is of similar construction with a dryer floor, unloading auger, and leveler. Dryer fan, heater unit, and motor are also considered part of the drying bin.

MISCELLANEOUS COSTS

STEEL GRAIN BINS

Sacramento and Northern California

GRAIN DRYING BINS

	Eave Heights								
Diameter	**8'**	**10'**	**13'**	**16'**	**18'**	**21'**	**24'**	**32'**	**40'**
14'	12,752	12,989							
18'	14,394	15,098	15,447	15,794	16,616	16,964	18,718	23,166	26,326
21'		16,964	17,554	18,021	18,718	19,539	21,648	26,681	29,722
24'		19,427	19,893	20,591	21,356	22,464	25,038	30,711	34,052
27'		23,284	23,870	24,807	25,623	27,383	30,189	37,437	39,781
30'		26,213	26,681	27,613	28,783	30,420	33,230	40,950	45,393
36'			35,327	36,559	38,257	40,012	65,780	51,949	58,971
42'				45,162	45,747	48,203	56,632	65,038	75,936
48'				57,915	61,423	65,055	69,907	79,562	83,070

Includes cost of foundation, perforated floor, unloading auger, aeration unit, fan, dryer, and stirring devices.

GRAIN STORAGE BINS

	Eave Heights											
Diameter	**8'**	**10'**	**13'**	**16'**	**18'**	**21'**	**24'**	**32'**	**40'**	**48'**	**58'**	**64'**
14'	6,495	6,787										
18'	7,371	8,131	8,603	8,951	9,074	10,064	11,936	15,564	18,431	21,294		
21'		9,243	9,829	10,178	10,532	11,583	13,922	18,134	21,063	24,807		
24'		10,761	11,347	11,701	12,871	13,455	16,497	20,708	24,571	28,665	34,221	38,027
27'		12,871	13,455	14,041	15,210	17,082	20,180	26,326	29,250	35,457	42,706	47,091
30'		14,624	15,210	15,794	16,964	19,427	21,878	28,553	32,759	38,904	48,677	54,754
36'			19,888	21,182	22,351	24,807	28,435	36,267	42,356	50,895	62,940	70,201
42'				26,562	27,265	28,901	38,027	45,747	55,462	65,055	78,387	86,815
48'				36,738	39,776	43,289	49,143	56,745	64,932	76,048	92,427	102,374

Includes cost of bin foundation, door, ladder, and unloading auger.

ADD FOR: Roof Augers **$650 - $1,000** (depends on length—13' to 24')
Fan **$1,700** (5 H.P.) to **$3,100** (25 H.P.)

PERFORATED FLOORS

14'	**18'**	**21'**	**24'**	**27'**	**30'**	**36'**	**42'**	**48'**
$1,300	$1,900	$2,350	$3,000	$3,650	$4,550	$6,350	$8,200	$9,950

MISCELLANEOUS COSTS

2-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
500	5'	4'	$2,500
1,000	6'	6'	2,950
1,500	7'	6'	3,750
2,000	8'	6'	4,400
3,000	10'	6'	6,000
4,000	10'	8'	7,200
5,000	11'	8'	8,200
6,000	12'	8'	9,400
7,000	11'	10'	10,000
8,000	12'	10'	10,400
9,000	13'	10'	11,400
10,000	14'	10'	12,800
12,000	15'	10'	14,000
15,000	14'	14'	16,100

Above costs include chime joists, covers, foundation, and all labor, set up, and transportation charges.

ADD FOR:	Ladders	**$15** per lineal foot
	Water level registers	**$10** per lineal foot of tank height
	Cone covers	**$400 - $1,400** per tank

MISCELLANEOUS COSTS

3-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
10,000	14'	10'	$18,600
12,000	14'	12'	21,900
15,000	16'	12'	23,400
20,000	18'	12'	30,200
25,000	17'	16'	33,000
30,000	20'	14'	38,300
40,000	23'	14'	48,000
50,000	24'	16'	53,800
60,000	26'	16'	60,400
70,000	28'	16'	64,300
75,000	29'	16'	72,900
80,000	30'	16'	78,600
90,000	30'	18'	82,600
100,000	32'	18'	88,000
150,000	37'	20'	118,000
200,000	43'	20'	142,000

Above costs include typical foundation, chime joists, tank cover, and all labor, set up, and transportation charges.

CYLINDRICAL 3-INCH REDWOOD WINE TANKS

Gallons Capacity	Base Price
1,000	$4,500
1,500	5,900
2,000	6,800
2,500	8,100
3,000	9,500
4,000	10,150
5,000	12,500
7,500	15,400
10,000	17,100
15,000	23,700
20,000	28,800
25,000	31,800
30,000	35,900

Base price includes 4" x 6" chime joists, 1/2' galvanized hoops, recessed head cover, side door with galvanized T-bolt.

MISCELLANEOUS COSTS

STAINLESS STEEL WINE TANKS

Gallons Capacity	Cost
1,000	$6,400
2,000	9,000
3,000	10,300
4,000	11,500
5,000	12,700
10,000	15,500
20,000	25,000
50,000	45,700
100,000	76,000
200,000	138,000

Cost includes all valves, temperature controls, vents, and cooling jackets for tanks with a capacity of 20,000 gallons or less. The cost on tanks of 50,000 gallons or more excludes cooling jackets.

CYLINDRICAL 2 INCH OAK TANKS

Gallons Capacity	Base Price
500	$2,050
750	3,000
1,000	3,900
1,250	4,800
1,500	5,550
2,000	7,800
2,500	9,000
3,000	10,300
4,000	13,800
5,000	16,600
6,000	20,000

Base price includes 4" x 6" chime joists, galvanized hoops, head supports with stainless steel head bolts, side door with stainless T-bolt, installation in Sonoma County. Foundations not included.

MISCELLANEOUS COSTS

PREFABRICATED METAL SHADES

SPECIFICATIONS

Foundation	Metal base plate with tie downs
Floor	Dirt
Wall/Roof Frame	2 3/8" galvanized structural tubing (4' on center) 7' to 9' eaves
Roofing	29-gauge steel with baked on enamel (extends 6" to 12" below eaves)
Exterior Wall Covering	None

COMMON SIZES

12' x 21'	$1,050	20' x 21'	$1,800
12' x 26'	1,260	20' x 26'	2,200
12' x 31'	1,650	20' x 31'	2,700
12' x 36'	1,920	20' x 36'	3,200
12' x 41'	2,200	20' x 41'	3,580

RV SHADES

14' x 30' x 12'	$3,200
14' x 40' x 12'	4,250

ADDITIVES

- Add 6 percent to above prices for 26-gauge steel roofing
- 29-gauge metal wall covering—**$1.00** per square foot of wall (standard roofing extends 6" to 12" below eaves)
- Back enclosure kit:
  12-foot wide — **$400**
  20-foot wide — **$525**
- Front enclosure kit with opening for roll-up door:
  12-foot wide — **$300**
  20-foot wide — **$350**
- Light duty roll-up doors
  8' x 6' — **$300**
  9' x 7' — **$350**
  10' x 8' — **$400**
  10' x 10' — **$450**
- Walk-thru door 32" x 72" —**$200 to $250**
- Add 3 percent for each additional foot of wall height above 8 feet
- Concrete floor—**$3.25 to $4.00** per square foot
- Windows 30" x 30" — **$125**

MISCELLANEOUS COSTS

PREFABRICATED METAL SHADES

PICTURES

AH 534.80: WIND MACHINES

NEW

New machines will average a physical life of 30 years. Typical usage will average 100 - 150 hours per year. Each wind machine will service approximately 10 acres.

WIND MACHINES

Model	Cost
G.P. 359 Cummins Diesel	$21,750
130 H-P Ford V-10 L.P.G.	$19,500
130 H-P Ford 460 L.P.G.	$17,300
115 H-P John Deere 6068 Diesel	$21,500
100 H-P Electric	$15,500
75 H-P Electric	$15,000
Portable Low Crop 115 H-P John Deere	$21,000
Portable Low Crop V-10 Ford L.P.G.	$20,500

Tower height for above machines is 36 feet.

OPTIONS

Item	Cost
41 Foot Tower	$850
Auto Thermostat Control	$3,000
Variable Speed Rotation	$1,500
Contour Assembly	$3,800

Above prices include foundation and installation.

WIND MACHINES

USED

USED ELECTRIC MACHINES

H-P	Model	Cost
12 1/2*	Frostmaster	$1,500
12 1/2*	Tropic Breeze	$1,500
25*	Frostmaster (Wood Fan)	$2,500
25*	Frostmaster (Metal Fan)	$2,500
25*	Tropic Breeze	$2,500
35*	Frostmaster	$2,700
40*	Tropic Breeze 900 RPM	$3,500
40*	Tropic Breeze Teeter Hub Fan	$3,500
50*	Tropic Breeze Teeter Hub Fan	$4,000
50*	Tropic Breeze 900 RPM	$4,000
60*	Tropic Breeze 900 RPM	$4,500
60*	Tropic Breeze Teeter Hub Fan	$4,500
75	Tropic Breeze 900 RPM	$4,500
75	Tropic Breeze Teeter Hub Fan	$4,500
100	Tropic Breeze 900 RPM	$5,250
100	Tropic Breeze Teeter Hub Fan	$5,250
125	Tropic Breeze 900 RPM	$6,700
125	Tropic Breeze Teeter Hub Fan	$7,000

The cost of used wind machines can vary widely depending upon the age and condition of the equipment.

USED GAS & *PROPANE MACHINES

H-P	Model	Cost
223-6	Gasoline 68 H-P	$4,000
240-6	Gasoline 68 H-P	$4,500
292-V-8	Gasoline 86 H-P	$5,500
332-V-8	Gasoline 86 H-P	$5,500
300-6	Gasoline 92 H-P	$6,000
391-V-8	Gasoline 100 H-P	$7,000
391-V-8	Gasoline 125 H-P	$7,500
460-V-8	Gasoline 125 H-P	$9,000

All the above machines can be converted to propane if desired. Cost will be **$600** additional for each motor.

DIESEL MACHINES (REBUILT ENGINES)

330 Ford *	6 Cylinder	Diesel - 81 H-P	$8,000
363 Ford *	6 Cylinder	Diesel - 100 H-P	$9,000
378 Cummins *	V-6	Diesel - 125 H-P	$9,000

The above prices include a 550 gallon above-ground fuel tank. Larger tanks are available on request at additional cost.

- Denotes: No longer made

WIND MACHINES

RECONDITIONED

RECONDITIONED ELECTRIC MACHINES

Model		Cost
100 H-P	Phoenix	$5,700
100 H-P	Tropic Breeze PODS	$5,700
75 H-P	Tropic Breeze PODS	$5,000
75 H-P	Tropic Breeze D. Flange	$5,000
50 H-P	900 RPM	$5,000

RECONDITIONED GROUND POWERED TROPIC BREEZE

Model		Cost
292 H-P	Ford, Propane	$7,000
332 H-P	Ford, Propane	$6,700
300 H-P	Ford, Propane	$8,000
391 H-P	Ford, Propane	$9,000
460 H-P	Ford, Propane	$10,000
In Line 6	John Deere, Diesel	$12,500
In Line 6	Cummins, Diesel	$12,000
V-6	Cummins, Diesel	$10,500

RECONDITIONED EOT

Model		Cost
223 H-P	Ford, Gas	$4,000
292 H-P	Ford, Propane	$5,000
391 H-P	Ford, Propane	$8,000
460 H-P	Ford, Propane	$9,250

NOTE: All used costs listed above include foundation and installation.

WIND MACHINES

ABBREVIATIONS

GP	Ground Power
RT	Rotating Tower
TT	Tall Tower
ST-ROT	Standard Rotation
SP-ROT	Special Rotation
LC	Low Crop
S	Single
D	Dual
EOT	Engine on Tower
SC	Special Contour

WIND MACHINES

PICTURES

AH 534.90: DEPRECIATION

AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

Use Type of Improvement	Quality/Type	Type of Schedule	Average Life
Barns (General Farm)	Poor	R.	20
Barns (General Farm)	Fair	R.	30
Barns (General Farm)	Good	R.	40
Barns (General Farm)	Excellent	R.	60
Barns, Dairy	Poor	R.	20
Barns, Dairy	Average	R.	20
Barns, Dairy	Good	R.	25
Cold Storage Food Lockers	Poor	O.R.	30
Cold Storage Food Lockers	Average	O.R.	40
Cold Storage Food Lockers	Good	O.R.	50
Cold Storage Warehouses	Poor	O.R.	40
Cold Storage Warehouses	Average	O.R.	50
Cold Storage Warehouses	Good	O.R.	60
Cotton Gins		O.R.	30
Drive-In Theaters	Poor	O.R.	20
Drive-In Theaters	Good	O.R.	30
Drying Sheds (Fruits & Nuts) (Wood Frame)	Poor	R.	10
Drying Sheds (Fruits & Nuts) (Wood Frame)	Fair	R.	20
Drying Sheds (Fruits & Nuts) (Wood Frame)	Good	R.	30
Fences, Wood or Wire	Poor	R.	10
Fences, Wood or Wire	Average	R.	20
Fences, Wood or Wire	Good	R.	30
Fences, Chain Link, Residence-Farm	Light	R.	20
Fences, Chain Link, Industrial-Commercial	Good	R.	30

DEPRECIATION

AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

Use Type of Improvement	Quality/Type	Type of Schedule	Average Life
Frost Protection Wind Machines		R.	30
Grain Elevators	Concrete and Metal	O.R.	50
Grain Storage Bins	Metal	O.R.	40
Grain Storage Bins	Concrete	O.R.	60
Greenhouses, Commercial	Poor Wood Frame	O.R.	20
Greenhouses, Commercial	Average	O.R.	30
Greenhouses, Commercial	Good	O.R.	40
Greenhouses, Conservatory (Back Yard)	Poor	R.	10
Greenhouses, Conservatory (Back Yard)	Good	R.	20
Hog and Sheep Sheds and Corrals	Poor	R.	10
Hog and Sheep Sheds and Corrals	Fair	R.	20
Hog and Sheep Sheds and Corrals	Good	R.	30
Lath Houses	Poor	R.	10
Lath Houses	Fair	R.	20
Lath Houses	Good	R.	30
Motor Truck Scales	Wood Under-structure	O.R.	30
Motor Truck Scales	Wood Under-structure	O.R.	40
Poultry Houses	Poor	R.	10
Poultry Houses	Medium	R.	20
Poultry Houses	Good	R.	30
Rice Drying and Storage Plants	Concrete and Metal	O.R.	50

DEPRECIATION

AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

Use Type of Improvement	Quality/Type	Type of Schedule	Average Life
Service Stations	Poor Wood Frame	O.R.	20
Service Stations	Good Wood Frame, or Light Steel, or Masonry	O.R.	25
Service Stations	Good Wood Frame, or Light Steel, or Masonry	O.R.	30
Silos, Wood	Poor	R.	20
Silos, Wood	Good	R.	30
Silos, Masonry - Tile and Basalite		R.	40
Silos, Masonry - Concrete		R.	50
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Light	O.R.	40
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Medium	O.R.	50
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Heavy	O.R.	60
Storage Sheds (Frame)	Poor	R.	20
Storage Sheds (Frame)	Fair	R.	30
Storage Sheds (Frame)	Good	R.	40
Swimming Pools	Poor	R.	10
Swimming Pools	Fair	R.	20
Swimming Pools	Good	R.	30
Water Tanks, Elevated	Wood Frame and Tank	O.R.	30
Water Tanks, Elevated	Wood Frame and Tank	O.R.	60

Poor = Poorest grade of materials; not contractor erected.
Fair = Average materials; builder erected.
Good = Good materials; good design; erected by competent builder.

DEPRECIATION

NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

Age Years	20 Years Avg Life		25 Years Avg Life		30 Years Avg Life		40 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	20	100	25	100	30	100	40	100
1	19	94	24	95	29	96	39	98
2	18	88	23	90	28	93	38	96
3	17	81	22	86	27	89	37	94
4	16	75	21	81	26	86	36	92
5	15	69	20	77	25	82	35	90
6	14	63	19	72	24	79	34	87
7	13	59	18	68	23	75	33	84
8	12	57	17	63	22	71	32	82
9	11	55	16	60	21	67	31	80
10	11	53	16	58	20	64	30	77
11	10	50	15	56	19	60	29	74
12	9	48	14	54	19	59	28	72
13	8	46	13	53	18	57	27	70
14	7	44	12	51	17	56	27	67
15	7	42	11	49	16	54	26	65
16	6	40	11	48	15	53	25	62
17	5	38	10	46	14	52	24	60
18	5	36	9	44	13	50	23	59
19	4	33	8	43	13	49	22	58
20	4	31	7	41	12	47	21	56
21	3	29	7	39	11	46	21	55
22	3	27	6	37	11	44	20	54
23	3	25	6	35	10	43	19	53
24	3	23	5	34	9	42	18	52
25	2	21	5	32	9	40	17	51
26	2	19	4	30	8	39	17	50
27	2	16	4	29	7	37	16	49
28	2	14	4	27	7	36	15	48
29	2	12	3	25	6	34	14	47
30	1	10	3	24	6	33	14	46
31			3	22	5	31	13	45
32			3	20	5	30	12	44
33			2	18	5	29	12	43
34			2	17	4	17	11	42
35			2	15	4	26	11	41
36			2	13	4	24	10	40
38			1	10	3	21	9	38
40					2	19	7	35
42					2	16	6	33
46					1	10	5	29
50							4	25
55							3	20
60							2	14
64							1	10

DEPRECIATION

NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

Age Years	45 Years Avg Life		50 Years Avg Life		55 Years Avg Life		60 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	45	100	50	100	55	100	60	100
2	43	97	48	97	53	98	58	98
4	41	93	46	94	51	96	56	96
6	39	89	44	91	49	94	54	94
8	37	85	42	88	47	91	52	92
10	35	81	40	85	45	88	50	90
12	33	77	38	82	43	85	48	88
14	32	73	36	78	41	82	46	86
16	30	69	35	74	40	79	45	83
18	28	65	33	70	38	76	43	80
20	26	60	31	67	36	73	41	77
22	24	58	29	63	34	69	39	74
24	23	56	28	60	32	65	37	71
26	22	54	26	58	31	62	35	68
28	20	52	24	56	29	60	34	65
30	18	50	23	54	27	58	32	63
32	17	48	21	53	26	56	30	60
34	15	47	20	51	24	55	29	58
36	14	45	18	49	23	53	27	57
38	12	43	17	47	21	51	26	55
40	11	41	16	45	20	50	24	54
42	10	39	14	44	19	48	23	52
44	9	37	13	42	17	46	21	51
46	8	35	12	40	16	45	20	49
48	7	33	11	38	15	43	19	47
50	6	31	10	37	14	41	18	46
52	5	29	9	35	12	40	16	44
54	5	28	8	33	11	38	15	43
56	4	26	7	31	10	36	14	41
58	4	24	6	30	9	35	13	40
60	3	22	5	28	8	33	12	38
62	3	20	4	26	7	31	11	37
64	3	18	4	24	6	30	10	35
66	2	16	3	22	5	28	9	33
68	2	14	3	21	5	27	8	32
70	2	12	3	19	4	25	7	30
72	1	10	2	17	4	23	6	29
76			2	14	3	20	5	26
80			1	10	2	17	4	23
84					1	10	2	16
96							1	10

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

Age Years	20 Years Avg Life		25 Years Avg Life		30 Years Avg Life		35 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	20	100	25	100	30	100	40	100
1	19	95	24	97	29	98	34	99
2	18	90	23	93	28	96	33	97
3	17	85	22	90	27	93	32	95
4	16	79	21	86	26	90	31	93
5	15	73	20	82	25	88	30	91
6	14	67	19	78	24	85	29	89
7	13	61	18	74	23	82	28	87
8	12	56	17	70	22	79	27	85
9	11	51	16	65	21	75	26	83
10	10	49	15	60	20	72	25	80
11	9	48	14	56	19	68	24	78
12	9	46	13	52	18	65	23	75
13	8	44	12	50	17	61	22	72
14	7	43	11	48	16	58	21	69
15	6	43	10	47	15	54	20	66
16	6	41	9	46	14	50	19	63
17	5	39	8	45	13	49	18	60
18	5	38	8	44	12	48	17	57
19	5	37	7	43	12	47	16	54
20	4	35	7	42	11	47	15	51
21	4	34	6	41	11	46	14	50
22	4	33	6	40	10	45	13	49
23	3	32	5	39	10	44	13	48
24	3	30	5	38	9	43	12	47
25	3	29	5	37	9	43	12	47
26	3	28	4	36	8	42	11	46
27	2	27	4	35	8	41	11	45
28	2	25	4	34	7	40	10	44
29	2	24	4	33	7	39	10	43
30	2	22	3	32	6	38	9	43
31	2	21	3	31	6	37	9	42
32	1	20	3	30	5	36	8	42
33			3	29	5	35	8	41
34			3	28	5	35	7	40
35			2	27	5	34	7	39
36			2	26	4	33	6	38
38			2	24	4	32	6	37
40			2	22	3	30	5	36
42			1	20	3	28	5	34
45					2	26	4	32
48					2	23	3	30
52					1	20	3	27
56							2	24
62							1	20

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

Age Years	40 Years Avg Life		45 Years Avg Life		50 Years Avg Life		55 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	40	100	45	100	50	100	55	100
2	38	98	43	99	48	99	53	99
4	36	96	41	97	46	98	51	98
6	34	93	39	95	44	97	49	97
8	32	90	37	93	42	95	47	96
10	30	86	35	90	40	93	45	95
12	28	82	33	87	38	91	43	94
14	26	78	31	84	36	88	41	92
16	24	73	29	81	34	85	39	90
18	22	68	27	77	32	82	37	88
20	20	63	25	73	30	80	35	86
22	18	58	23	69	28	77	33	83
24	17	53	21	65	26	73	31	80
26	15	50	20	60	24	69	29	77
28	14	48	18	55	23	65	27	74
30	13	47	17	50	21	61	26	71
32	11	45	15	49	20	57	24	67
34	10	44	14	48	18	53	22	63
36	9	43	13	47	17	50	21	59
38	8	42	12	46	16	48	19	55
40	8	40	11	44	14	47	18	52
42	7	39	10	43	13	46	17	50
44	6	38	9	42	12	45	16	49
46	6	36	8	41	11	44	15	48
48	5	35	7	40	10	43	14	47
50	5	34	7	38	10	42	13	45
52	4	32	6	37	9	41	12	44
54	4	31	6	36	8	40	11	43
56	3	30	5	35	8	39	10	42
58	3	29	5	34	7	38	9	41
60	3	27	4	32	7	37	9	40
62	2	26	4	31	6	36	8	39
64	2	25	4	30	6	35	8	38
66	2	24	3	29	5	34	7	37
68	2	22	3	28	5	33	7	36
70	2	21	3	27	4	32	6	36
72	1	20	3	25	4	31	6	35
74			2	24	5	30	5	34
76			2	23	3	28	5	32
82			1	20	3	26	4	30
84					2	24	4	29
88					2	22	3	27
92					1	20	2	25
96							2	23
102							1	20

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

	60 Years Average Life		70 Years Average Life	
Age Years	Remaining Life Years	Percent Good	Remaining Life Years	Percent Good
0	60	100	70	100
2	58	99	68	99
4	56	99	66	99
6	54	98	64	99
8	52	97	62	98
10	50	96	60	98
12	48	95	58	97
14	46	94	56	96
16	44	93	54	96
18	42	92	52	95
20	40	89`	50	94
22	38	87	48	93
24	36	85	46	92
26	34	83	45	91
28	32	81	42	89
30	30	78	40	87
32	29	75	39	85
34	27	72	37	83
36	25	69	35	81
38	24	66	33	79
40	22	63	31	76
42	21	60	30	73
44	20	56	`29	70
46	18	52	27	67
48	17	49	26	64
50	16	48	25	61
52	15	47	23	58
54	14	46	22	56
56	13	46	21	54
58	12	45	20	52
60	11	44	19	50
64	10	42	17	48
68	9	40	15	46
72	8	38	13	44
76	7	36	12	43
80	6	35	11	41
86	5	32	9	39
92	4	29	8	36
100	3	25	6	33
108	2	22	4	29
112	1	20	3	27
122			2	24
130			1	20